

ANGLIA RUSKIN UNIVERSITY

**Teaching Modes of Teacher-educators
teaching Distance-learning in a
Teacher-training College in Israel:
A Case Study**

by

Smadar Bar-Tal

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requirements of Anglia Ruskin University for the
degree of Doctor of Philosophy

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This thesis is dedicated with much love to my dear mother of blessed memory, Eda Efratí. To her great regret and definitely to mine we were only able to enjoy two short decades of love and happiness together

She herself was an educator, valued and respected by her pupils, their parents and her colleagues in the education system. Her positive approach to the world, and her infinite ability to find good, worth and beauty in everyone, granted me a firm and trustworthy foundation for life as a human being and in particular as a qualitative education researcher.

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Doctor of Philosophy

**Teaching Modes of Teacher-educators teaching Distance-learning in a
Teacher-training College in Israel: A Case Study**

By Smadar Bar-Tal

ABSTRACT

The introduction of technology and the widespread use of ICT in the wealthier nations have led teacher-educators to integrate technological applications in their teaching environment. The research investigated the new teaching modes created by teacher-educators in teacher-training colleges in Israel, due to their transition from traditional teaching to distance-teaching through the Internet.

This was a qualitative research using case study within an interpretative paradigm that enabled the researcher to consider the viewpoints of the informants together with her own viewpoint. The research tools included: 14 open interviews, a non-participatory observation, documentation reading and the writing of a personal log. The rich variety of research tools enabled triangulation of data. The conceptual framework of the research was based on theories of teacher-training, distance-teaching, academic disciplines, and several teaching dimensions: organisation and representation of data, organisation and management of teaching and different types of interaction.

The research findings indicated intrinsic and extrinsic motives for the teacher-educators transition to distance-teaching. The transition created a pedagogy characterised by four teaching modes that corresponded to different academic disciplines. Each discipline harnessed the technology for intensive use in one or more of the teaching dimensions. The Representation mode used by teacher-educators in the natural sciences and statistics used a large variety of data representations and Internet writing characterised by multiple links. The Interactive mode employed by teacher-educators in the field of literacy principally dealt with formative assessment of the students' writing and used virtual communication tools to tighten the teacher-learner inter-personal interaction. The Organisational mode used in education disciplines focused on organisation and management of teaching and learning through the use of computer applications. The Holistic mode employed by teacher-educators in the fields of education and literature, in substance constituted a combination of all the characteristics of the above-mentioned modes with an emphasis given to social presence of both learners and the teacher. Analysis of the teaching modes led to the creation of a typology of four modes positioned at different points along the following scales: organisation of teaching, flexible – fixed, types of interaction few – multiple; data representation, creative – conservative; computer literate – computer users. There was a clear contrast between teacher-educators teaching education disciplines as a continuation of traditional frontal teaching and those who had previously taught in workshops.

At the crossroads of pedagogy with technology, the changes in location, time and lesson character have meant that the implementation of the teaching paradigm of Zeichner and the teaching orientations of Feiman-Nemser have taken on fresh dimensions. The new teaching modes necessitate appropriate training for all teacher-educators working in distance-teaching in accordance with their academic disciplines. The research findings contribute to the reduction of a gap in knowledge concerning the new teaching modes of teacher-educators teaching distance-learning in a teacher-training college in Israel.

Prologue

For many years I taught according to the traditional method of transmission of knowledge until 15 years ago when I was privileged as a middle school teacher to participate together with my class, in a computer-assisted project. This experience deepened my understanding of technology's immense potential and the understanding that the computer embodies tremendous power as an inexhaustible source of knowledge for the world of education.

Later, in 2002, in my work at a teacher-training college, we held a seminar in which each of the teacher-educators, who operated a course site, presented their site to their colleagues. This event was from my point of view, an inaugural event, because it was here that I understood that the sites were not uniform, their manners of organisation, the sites played in the course and the ways in which the teacher-educators used technology for the site differed and the focus was placed on different aspects of teaching and learning. I understood that this was a special and interesting issue that should be researched in order to understand its motives, processes and results.

At a later date, I accepted the suggestion of the college and studied a course in distance-teaching. Exposure to the theoretical aspects alongside the practical experience contributed to my personal and professional development and engendered a significant change in me as a teacher, as a distance-teacher, as a person and as a member of society. I became a source of knowledge and support and guidance for my colleagues in the college teaching staff and a member of the Centre for Digital Learning. Working together with these people strengthened my comprehension concerning this subject. At the same time I read much research and other literature and became aware of new applications as I searched for innovations and originality in this area.

I have for several years been an active participant in a group with an interest in qualitative research at the Mofet Institute (School for Research, Curriculum and Programme Development for Teacher-educators). I entered the world of 'qualitative research', discovering its abundant treasure and acquiring tools and skills in order to observe and interview people, and to extract detailed data from documents.

Going deeper into teaching theory, I understood that there are several teaching methods and not just the traditional model of transmission that I had learnt as a student and applied as a teacher. My research and experiences in distance-teaching led me to alter my teaching approach and teaching methods that I had previously employed. The wealth of materials that I gathered opened up many and varied directions and research fields, all of which appeared to be very interesting and innovative.

In my research, I chose to focus on the subject of the distance-teacher's role perception from the viewpoint of each of those who shared this role. During my research I understood that my work actually dealt with their teaching modes and not their role perceptions and so the study led to the characterisation of four modes of teaching style, which will in this thesis be referred to as 'modes', and their association with the teaching of different academic disciplines.

Introduction

This research deals with teacher-educators, teaching in teacher-training colleges in Israel. Teacher-training in many world states, in Israel, relies on different approaches such as the traditional behaviourist, personal and research-centred paradigms and practical, personal, technical, academic and critical/social orientations. Teacher-training colleges are run by teacher-educators with knowledge of academic disciplines acquired from different sources and constructed from different types of knowledge.

The widespread use and influence of the computer and Internet for both children and adults in the 21st century/ has engendered change in the teaching and learning environment including teacher-training colleges. The transition to distance-teaching in colleges and universities, and also the integration and use of technology has created new modes of teaching expressed in three main dimensions: (1) organisation of information, using reading and writing of Internet language and employing presentations and software, and Internet tools such as forums and e-mail; (2) the organisation and management of teaching expressed in teacher-focused teaching or learner-focused teaching, assessment methods and their adaptation to the adult learner's learning styles; (3) the contribution of a teaching presence and the status of the constructivist approach in teaching and learning; manners of interaction embroidered between teacher-student-students-content, and a multiplicity of communication channels that they create or prevent. All these elements enrich or hinder the social presence of teachers.

The purpose of the research is to understand the intrinsic and extrinsic motives for the transition of teacher-educators to the on-line teaching environment, while the principal research question aims to uncover the uniqueness of the new teaching modes created by this transition in relation to specific academic disciplines.

Chapter 1:

Background of the Study:

Training Teachers and Teacher-Educators

This chapter introduces the reader to the subject of teacher-training in Israel and internationally explaining how teacher-educators enter their roles and how they receive their training. (For further details on this issue see Appendix IA: The Status of Teacher-Training)

1.1 Teacher Learning in the 21st Century

Today there is a general expectation that schools throughout the world will undergo serious reform due to demographic changes, economic globalisation and technological and cultural trends. There is also widespread consensus that the teacher should be seen as the focal figure in these processes (Darling-Hammond & Bransford, 2005), and an understanding that teachers' professional development constitutes the central tool for the improvement of teaching. One of the problems involved is that teachers perceive their present professional development as truncated, non-cohesive and irrelevant to their teaching difficulties and context (Lieberman & Miller, 2001; Hatch et al., 2005).

Lieberman & Pointer-Mace (2010) suggest that teacher learning progresses in a series of stages:

1. From isolation to collegueship
2. From collegueship to professional learning community
3. Turning it into practice – a practice community – see 'Professional learning communities 2.0: Moving teacher development online' in Lieberman & Pointer-Mace, 2010).
4. Insights about networked learning communities and teaching.
5. The translocation (and transformation) of knowledge of-and-for teaching.
6. A vision of home-grown professional learning, applying the tools for the task.

Lieberman & Pointer-Mace (ibid) note that willingness to expose daily teaching practice, with all its details and contents to the public, reflects a meaningful process of professional development. It is important that teachers follow recording practices and they should have suitable tools and instruments available for this purpose that they can integrate into their daily work, viewing this process as something important and relevant.

1.2 Teaching

'Teaching' encompasses a very wide area and has been the subject of copious studies. Teaching is not an independent entity. It is bonded with the learner's learning, according to the learner's age, ability and skills. Teachers maintain the pedagogic beliefs and teaching behaviour that they themselves experienced as pupils, or the methods of teaching that suit the learning methods they prefer rather than reflecting the teaching theories that they learnt during their teacher-training process (Soter, 1993; Felder & Silverman, 1993). Student-teachers' perceptions play a decisive role in the formation of the teacher image and style of teaching they will adopt in the future (Wang, 2000) (Byrum & Cashman, 1993).

Clark & Peterson (1986) point out that the teaching process involves two components with reciprocal relations between them: the teacher's thinking and the teacher's actions. These two components interrelate with two types of teachers' thinking about their teaching:

- Preparatory thinking of the teachers, including pre-active thoughts (before the teaching) at the stage when the teaching is planned.
- Post- activity thoughts as feedback after the teaching process.

Lowman (1996) indicates that effective teaching includes two central dimensions. The first dimension relates to skills used to present learning material, i.e. the ability to present the material in an organised and interesting manner, while the second relates to inter-personal relations, i.e. a relationship

of respect for learners while encouraging them to invest in the learning and to achieve highly (Galland, 2002).

Many difficulties are encountered in teaching, so that a gap is evident between teachers' declared pedagogic perceptions and their pedagogic activity (Yakobi & Sharon, 1985). Teachers find it difficult to combine theory with practice because theories are defined for the teachers by others while they create their practice themselves (Lampert, 1985). It is therefore necessary to connect the teaching with the learning, to encourage the students' commitment to learning and to develop teaching and learning strategies.

Teaching does not operate in an empty space; it exists within a continuous dialogue with the learner. In a study that related to universities and colleges, Hativa (1997) found that many teachers feel that they do not succeed in implementing effective learning as they would like to and are able to, and that there is a real gap between what they try to teach and what the pupils do learn. Thus one of the goals of teaching is to improve the learning process to enable learners to reach high achievements.

One of the means is development of self-learning management, where the teachers' role is to create a suitable and focused environment in which the students can receive inspiration and where they will be able to plan their self-learning (Boekaerts, 1997). Research has found that learners who manage self-learning are characterised by strong initiative in the management of their academic development, high motivation to learn and an ability to cope successfully with learning tasks that they set for themselves (Zimmermann & Martinez-pons, 1986; 1988; William, 1996).

Students who manage their learning autonomously are characterised by setting realistic goals for themselves, choosing suitable strategies to achieve them, confidence in their ability and in problem-solving on their path to their goal (Winne, 1996). Self-learning is a process that includes several areas: the behavioural area, the motivational area and the cognitive area and the meta-

cognitive area (Zimmermann, 1990). Further information concerning distance learning can be found in Appendices: 1A, 1B, 1C and 1D.

1.2.1 Distance Teaching

Definitions and models of distance teaching are presented in Appendix 1C.

Computer-mediated teaching developed without consideration for previous, traditional teaching methods (Buchanan, 1999; Williams, 2001). In distance-teaching the teachers need to adapt to a new approach to teaching and its perception as 'webagogy' and not 'pedagogy' (LaMonica, 2001). Teachers need to be aware not only of the learnt contents but especially aware of the way these contents are processed through the new teaching methods they have chosen, and to adapt their didactic method to different cognitive perceptions and learning styles, while using the different options made accessible to them by technology for the presentation of learning materials in different formats in order to respond to the learners' needs. Computer-mediated learning without 'eye contact' with learners obliges the teachers to be aware of the different difficulties and changes involved in the use of this strategy (Sherry, 1996; Carnevale, 2001; Edelstein, 2002; Anderson, 2003).

Additionally, according to Newman (2000) staff members feel threatened by technology; they may try to transfer strategies of face-to-face teaching directly to the cyberspace environment. In many cases this may lead to failure because they have no experience in managing virtual learning.

It takes more time to plan and construct a distance-teaching course than a face-to-face course, so that the teacher's time restrictions or lack of willingness to provide the necessary accessibility can constitute significant obstacles for the success of an on-line course. However the teacher can dedicate more time to the course than in face-to-face teaching because the time and place are unlimited (Buss, 2001; Galland, 2002). The teachers can spend time on or skip different subjects, but in contrast they devote part of their time to the creation of

links to other sources and knowledge and data-representation and providing support for the students' learning (Fox & MacKeogh , 2003; Collins, Schuster & Ludlow, 2002).

Additionally, on-line teaching demands that the teacher and students devote more time to reading than in face-to-face teaching (Lynch, 2002). In order to cope with this difficulty Lynch (2002) suggested ways to cope with the wealth of knowledge: definition of contents interesting the teacher, selective reading of materials, definition of the time framework for updating, not to be a slave to knowledge, not all knowledge is power.

Already at the planning stage the teacher must ask a number of questions and clarify several details (Sherry, 1996; Rotem, 1997; Harrison & Bergen, 2000; Volery & Lyon, 2001; Lynch, 2002; Killion, 2002; Collins et al, 2002; Wickstrom, 2003; Morland & Bivens, 2004; Heckman & Annabi, 2005):

1. Who is the target population? Familiarity with the readers will help the teacher to design the knowledge connection. The age of the learner, the learner's culture and socio-economic background and fields of interest, experience and educational level should be considered. It is also important to know whether the learner has mastery of distance-learning methods and technology. Answers to these questions will help construct the learner's profile.
2. How to organise the information on the site?
3. How to integrate technological tools?
4. Integration of examinations with a personal assessment using on-line forms and data reservoirs.
5. To observe existing courses.

Khan (2004) distinguishes two stages of content formation: the development of content and transfer and maintenance of content. It is first necessary to plan the course and then to choose the appropriate technology and not the opposite because pedagogy should lead (Lynch, 2002). Boonk & Dennen (1999) indicate that on-line courses lack a pedagogic facet and do not exploit the full

potential embodied in the new technology. Thus, Moore & Kearsley (1996) support conducting face-to-face sessions with the students in order to demonstrate the computer-mediated teaching, although there is still no certainty that the students will be able to use the technological expertise when they need it. In order to cope with this difficulty, Stodel et al. (2006) suggested creating a period of acclimatisation to computer-mediated learning, to help students integrate as participants within the cyberspace discussion and to familiarise them with computer-mediated team work.

In addition, Treacy et al (2002) suggested a face-to-face meeting during this maintain the impetus and to get to know the learners' learning strategies and their works and to present the-teaching goals. It is also possible at this point to relate to technical aspects and to allow people the opportunity to meet one another, Chepya (2005) raises an important issue that has been neglected by distance-learning and this is the question of the course design. When software is chosen to manage the computer-mediated course it is wise to consider the design and aesthetics that will express the computer-mediated pedagogy; as in a regular course the personal and pedagogic style of the instructor should be taken into account as a factor for success. Thus issues of graphic design, design and usability of the site environment should be considered by instructors for computer-mediated pedagogy without simply relying on the decision of technical managers of the distance-learning system.

At the start of the course the students should be presented with the conceptual framework: what are the goals and how the course subjects are organised for accessibility. The importance of such a framework is that it serves as a basis on which to anchor concepts, ideas and knowledge studied in the course and thus it provides the students with a complete picture, of the entire course structure. The subjects should be organised within the framework in a logical order. The conceptual framework may include the presentation of the structure of the materials, ideas and central theses, selecting concepts or a unifying theory (Hativa, 1997).

During the course the teachers need to provide a flexible presentation and activities in order to prevent frequent and direct questions and to take responsibility for the knowledge acquired by the students, and for the participation of the group while supplying periodic updates and reviewing discussions. (Mason, 1991; Hativa, 1997; Lynch, 2002; Aune, 2002)

1.2.1.1 The Significance of On-Line Teaching in Teacher Training

The rapid development of the virtual on-line schools (in which all learning stages are transmitted through the Internet outside the school) has not yet been expressed and recognised by the world's teacher-educators in their colleges and universities. Davis (2010) recommends that teacher training institute should take into account the developments that have occurred and will occur in full on-line teaching and that they should provide practical experience for student teachers in partial or full on-line teaching. Preparations should be made in order to meet the challenges of computerised teaching by teaching suitable teaching strategies and methods, which should become a core part of teacher training programmes and not merely a marginal supplement. These programmes should train teachers to take part in introducing change in the schools and to engender innovative leadership in the field of educational computerisation. In order to implement this system much more investment is necessary in research and development of appropriate teacher training programmes for the new generation of computer-assisted teachers.

Computerised on-line teaching through Internet, known as Virtual Schooling (VS) has gained momentum and according to various forecasts a third of USA high schools will employ VS by the year 2020. Similarly even traditional schools offer computerised courses for their regular students that enable them to study for one day a week from home. Full VS on the Internet requires completely other teaching methods and pedagogic strategies need to be adapted for on-line learning. For this reason USA teacher training programmes have begun to prepare programmes relating to this issue (Compton, Davis & Mackey, 2009)

1.2.121 Online Assessment

Scholars note that in most cases online assessment remains traditional and is constructed from a few short questions, each of which has a correct short answer (Zakrewski & Bull, 1998). In contrast, the studies by Shimoni et al. (2002) found that courses conducted in distance-learning almost without any face-to-face sessions, make it difficult for teachers to examine whether learning has taken place from lesson to lesson. The teachers find it difficult to relinquish this interim assessment which is perceived by most of them as a formative assessment. Some of them 'solve' this by providing 'small' tasks such as reading an excerpt and analysing it etc. almost immediately after the lesson.

Goldstein (2001) examined a wide variety of on-line courses and found that the methods of assessment differed from course to course, however in principle there were three types of assessment:

1. Formative self-assessment: using interactive tests that provide the learner with immediate feedback on the knowledge that the learner has understood and referring the learner if necessary to relevant learning material for revision.
2. Lecturer-assessment: relating to the learner's connection with the lecturer, the learner's active participation during the learning, compliance with the timetable and cooperation with other learners.
3. Peer-assessment: conducted by learners who assess the products of their peers and assess the extent of their participation in collaborative tasks.

1.2.1.3 The Importance of integrating Distance-teaching in Teacher-training

The Internet has become part of the environment within which we live, to the extent that it constitutes one of the components that define a society – a data-enriched society. Its rapid development is an obvious fact in all fields of life including the field of education (Crossman, 1997; Becker, 2000; Gibson & Oberg, 2004). Swift changes in the areas of technology, culture and society

(Toffler, 1970; Ball, 1987) mean that the education system needs to react in order to cope with the constantly changing reality and also to change (Fullan, 2001). Today, technology-fluency is increasingly considered to be a precondition for acceptance by a workplace and to take a full and active part in society (Resnick & Rusk, 1996).

The use of computers and the Internet is an inseparable part of their lives for youth or 'the net generation' as they are called by Tapscott (1998) in his book *'Growing up digital'*. Published data indicate that 98% of the children and adolescents in Britain have already used the Internet at least once (Livingstone & Bober, 2003). In the USA in 2008, 87% of all youths between the ages 12-17, i.e. 21 million people use the Internet, for them the use of a cyberspace environment is like 'oxygen for breathing' (Brown, 2006). People find that they are now communicating through many means with a host of friends that they have never met, and with whom they can exchange materials in common fields of interest that fascinate them. The net generation is an independent generation that will in the future change the appearance of the work setting, learning and world society, and the education system needs to adapt to the spirit of the time, while exploiting existing potential in the network for the improvement of learning and teaching processes. This data-enriched net generation motivates teachers to renew their thinking about their educational practice (Garrison and Anderson, 2004).

The abilities of synchronic and a-synchronic communication using sound, video, text and graphics mean that the Internet is an effective means to advance the school and those who learn within it (Anderson & Kanuka, 1997; Hara et al., 2000). Thanks to the Internet the school has access to far more knowledge and people than was possible in the past. It is possible to learn at different levels and to join different communities beyond their schoolhouse doors (Gomez et al., 2008).

The creation of a professional approach that provides the teachers with an opportunity for lifelong learning is a path that promises successful achievements for the children they teach, especially for those for whom education is the only path to survival and success (Darling-Hammond, 1988).

The international scarcity of teachers and learning facilities also encourages the use of distance learning at all learning stages (Baal Schem & Shinar, 1998). In this data-rich era, learning is a life-long process. Most learning activities will need to be conducted outside school and university and it is clear that there will be insufficient funds and teachers to provide these activities through traditional teaching. Distance-education is perceived as an economic way to provide continuous learning for professionals (Ball et al., 1998). By providing a response to the demand for distance-learning through modern applied technology, a new lifestyle will evolve in the 21st century. Education will be supplied at least partially through telecommunications media and each pupil and student can choose not only areas of interest but also preferred teachers (Ball et al., 1998). The use of the network may also produce a revolution in class dynamics and decisively alter the learning environment as it exists today (Schrum & Berenfeld, 1997).

Working from a distance has many advantages – it enables employees to have considerable control over their time, it opens new working opportunities for them. Studies (Ball, 1987; Baal Schem & Shinar, 1998) have shown that the effectiveness of distance-employees work rose by 20%. There is no doubt that from an economic viewpoint computer-mediated education is cheaper than education on campus and also more egalitarian (Salomon, 2000). It enables flexibility regarding time and location (Gell & Cochrane, 1996; Bentley, 1998; Enoch & Soker, 2006). Computer-mediated laboratories also enable access to simulations, low costs and saved time (Himelbloom, 2006), and are therefore convenient for students who have a heavy schedule and work to keep themselves (Laurillard, 1997; McConnell, 1998). It saves students' expenses on transportation to the campus (Ramirez, 2002). The teachers burdened by fulfilment of their home needs are saved the journey to the campus, finding

parking in an overcrowded space, and coordination of meetings with students in a heavy teaching timetable.

Distance-learning also enables each student to voice views, including shy students (Spencer, 1997). These technologies embody the potential to make many areas more accessible, to promote creativity and productivity and to enable the social and educational integration of different populations (Kozma, 2003). The fact that information technology is used improves achievements in the areas of education and training processes beyond previous levels (Rheingold, 2002). The new learning and teaching environment can be used and modified according to the users' needs (Harris, 1999). The main change in goals of the education system is the need to prepare the pupils for continuous learning by equipping them with thinking and learning skills and the ability to deduce conclusions (Resnick & Klopfer, 1989).

Towards the end of the 20th century it was reported that 13 million people had registered for courses in distance-teaching, this number is still increasing (Thomas, 1999). Distance-learning has spread throughout the world in recent years, especially with regard to universities and college (Navarro & Shoemaker, 2000). In the USA the movement for virtual high schools is growing. More and more schools offer on-line courses with distance-learning (Roblyer, 2003; Setzer, Lewis & Green, 2005).

According to different assessments, the demand for on-line courses in school will increase because a new generation of children has grown up in Internet-rich homes with broad-band communication (Wood, 2005). In the last two years virtual schools have significantly developed in the USA, the growth rate of virtual schools in recent years reached 25%. In 2008, 170 completely virtual schools operated alongside 25 government programmes for virtual-learning in primary and secondary schools (iNACOL Internet site, 2009); for example, the Virtual School of Florida (Florida Virtual School Internet site, 2009) includes thousands of pupils and also transmits virtual courses for another 55,000 pupils studying throughout the USA. Thus, the use of computer-mediated technology

and computer-mediated learning environments is now a central component and pupils need training to function in a data-rich world and to reinforce their skills to acquire and use knowledge (Department for Education and Skills, UK, 2006). From current statistics in June 2009 (Minute Bio site, 2009) it appears that there are more than 50,000 authorised and active MOODLE sites (a free and open source e-learning software platform) on the Internet in 210 world states. The amount of MOODLE-based courses in the world exceeds 3 million and the number of active participants, correct to June 2009, had reached 32 million. In Israel an article that describes the process of assimilation of on-line teaching in Tel Aviv university (from 1.2000-8.2007) indicates that the number of courses studied in their university that have a presence on the net, increased from 346 to 4,395 (out of 6,000) (Nachmias & Ram, 2009).

This process poses a difficult challenge for academics, the central question being how to create quality learning with the help of technology, learning that will respond to the requirements and needs of learners (Motiwalla & Teloo, 2000). According to Mason (1998) high development and assimilation costs for on-line courses necessitate examination and follow-up of the process and role definitions for all participants (Commission of the European Communities, 2003a).

A study by OECD (2006) indicated for the first time the clear and significant correlation between the frequent use of the computer and learning achievements in literacy and mathematics among tens of thousands of pupils aged 15 in 36 industrialised world states. Nevertheless, in a study conducted in Israel by Enoch & Soker (2006) concerning the participation of students in web-based instruction, it was found that it was necessary to augment computer use by this population. Acquisition of computer literacy and Internet skills will be important to students outside the academic area to facilitate absorption and progress at work, in leisure-time activities and political participation.

The early experience of student-teachers, serves as a significant foundation for the ways in which they think and act as teachers (Korthagen, 2001). According to Law et al. (2008) the influence of data and communications technology in teaching depends on the pedagogic perceptions of student-teachers. These perceptions are formed during their training in teacher-training institutions. Studies have shown that student-teachers do not use computerised tools in their school practicum since they do not learn these skills in the training institutes from lecturers who integrate computerisation in their teaching and therefore had no suitable model to imitate (Lan, 2001). There are only a few teachers who are able to include the use of technology in their teaching without experiencing such teaching as students (Flick & Bell, 2000). In contrast student-teachers who experienced computerised learning in college knew how to implement what they had learnt and used the technology in their school teaching (Mason, 2000).

Bracey (1993) found that teachers who initiate and lead the introduction of computers and have positive attitudes towards the use of the computer in education, developed in schools that exploited computers for more significant learning and intellectual profundity in learning. The International Society of Technology in Teacher Education (ISTE, 2000a) recommended different models for pre-service teacher training in computerised teaching: the integration of computerised teaching in didactic courses should include computerised teaching practice and acquisition of a computerised learning experience in general courses transmitted through data technology (Bullock, 2004). Despite the swift spread of distance-learning and the penetration of technology in education, it is still necessary to overcome the teachers' fear that they will become unwanted tools (Ball et al., 1998).

This field is still new among the higher education institutions and this new media engenders new styles to impart knowledge, raising new methodological and didactic questions (Herberger et al., 1998). The fast integration of the Internet in teaching has not allowed time for assessment and orderly thinking about many questions concerning the pedagogic and organisational substance

of this process. Studies in this field claim that technology has advanced both the pedagogical (Mioduser & Nachmias, 2002) and the strategic-organisational facets (Beller & Or, 2001) of teaching. It is known that the teaching of any educational subject that the teacher of the future is likely to have to teach will also be influenced by concepts formed during the teacher's experiences as a student (Ball & McDiarmid, 1990). The gap between intention on the verbal and theoretical level and its actual implementation in the learning environment, expressed today in the computerisation of education, stems from deficits in teacher-training (Salomon, 2000); this is training that focuses mainly on the acquisition of computer-using skills, without any connection to actual implementation of the skills in the specific learning environment of the class and without the teachers having any practical experience as learners in this new technology-assisted environment. Thus, irresolution and lack of willingness to cope with the new tools may damage the status of teacher-training institutions (Guri-Rosenblit, 2004).

An important issue in the educational renewal process is the issue of adapting teacher-training for full exploitation of the potential embodied in a computer-mediated learning environment and opportunities for its direct integration in teaching/learning processes in school.

Many researchers agree that teachers and their teaching methods together constitute the central and most important link in the entire process of educational renewal (Goodlad, 1994; Sarason, 1995). Published research (Henderson & Dancy, 2008) indicates that only a small percentage of lecturers tend to adopt new teaching approaches.

The adoption of such an approach necessitates change in lecturers' attitudes towards teaching, but as noted most lecturers in higher-education institutions have not been exposed to a process of identification of problems in computer-assisted teaching and attempts to provide responses for these problems (Redish, 2003; Maharshak & Pundak, 2004; Henderson & Dancy, 2008). In addition, adoption of a new teaching method necessitates development and

examination of new learning materials, practice of different teaching methods, changes in perception of the lecturer's role and additional methods of assessment. These changes require a long process of assimilation, with continual support by agents of change (Fagen et al., 2002). This was illustrated by the research conclusion of Zemsky & Massy (2004) in the USA that the revolution of distance-learning had failed. In their estimation, the main reason for this failure was that alongside the technological revolution, no similar pedagogical revolution occurred.

Technological advances have created a revolution and present a challenge to the education system in general and to higher education in particular (Leung & Levy, 2003). Lecturers, teachers and instructors have continued to learn according to the traditional principles of the physical class, blackboard and chalk, and these principles are unsuitable for the innovative methods of e-learning. Focusing on teachers as leaders of change and investing efforts in their training and professional pedagogic development for intelligent use of data technology in teaching should advance the pupils' use of computerisation for learning (Farby & Higgs, 1977).

Research by Easton (2003) found that the on-line teacher's role necessitates a substantial change in the whole perception of exploitation of time and teaching strategies. This involves a significant change in the perception of the teaching space and the time space in order to interest and challenge the learner-pupil in a computer-mediated course. This means that in the coming years there will be a need for teachers skilled in the delivery of computer-mediated learning because it is impossible to rely solely on the regular teachers that exist in the school to cope with the new environment.

Given the technological changes involved in the process of bonding the education system to the knowledge society, the teachers' role becomes central in the creation and structuring of teaching and learning processes suitable for the cyberspace. The new tools necessitate renewed thinking about methodologies in the academic field of teaching (Passig, 2003).

Gomez et al. (2008) recommended that technology should be used in teacher education to:

1. *Create technically literate educational professionals*
2. *Strengthen the practice-theory connection*
3. *Provide more practice-centered training*
4. *Reflect deeply into the scholarship and practice of teaching* (p.119).

A different viewpoint is expressed by Hogarth & Dawson (2008): a typical e-learning project is at the intersection of two error-prone domains: information systems (IS) and human systems. A 2003 Hackett Group study reported that 30% of information systems projects fail (Brown, 2007). E-learning, being an information system, suffers even higher failure rates (Hogarth & Dawson, 2008). These high failure rates indicate the existence of misconceptions regarding the implementation process and use of e-learning.

1.2.1.4 Anticipated Technologies

The Horizon Report (2010) focuses on a description of six technologies anticipated to be the most influential from now on. In the near future, the report's authors envisage that the use of portable computers, which most students already use, will increase and new opportunities for learning activities will be launched.

An additional short term trend is 'Open Course Ware' (OCW) that is expected to blend into leading higher education streams. In the longer term (two to three years), the authors of the Horizon Report (ibid) expect an increase in the use of electronic books and Simple Augmented Reality. Finally within the next four to five years it is anticipated that there will be increased adoption of Gesture-Based Computing and Visual Data Analysis (VDA), two relatively new technologies that form the focal concern of present research, but are not yet widely used in the universities. Gesture-Based Computing involves the control of computers by the user's natural bodily gestures, so that the computer reacts

to and creates an interaction with the user. VDA is a developing field that combines statistics, data mining and visualization.

1.2.1.5 How Teachers cope with the Transition to Distance Teaching

Researchers and educators from the field of distance-learning emphasise the substantial change between the role of the teacher in a traditional classroom and the role in a computer-mediated environment (Rossman, 1999; Bonk et al., 1999; Salomon, 1996; Sherry, 1996)

Rutherford & Grana (1995) found that academic staff may have fears relating to the new technology, for example fear of changes, fear of the need to invest time to learn the new technologies, fear that they lack suitable skills to use these technologies and fear of failure.

Brown (1999) asserts that whether technology is seen as the motivating power for teaching or as a system of tools to improve communications and broaden a variety of teaching methods, the development of processes and products begins with a small number of individuals or staffs and it is they who will determine whether the innovation filters into the general system or not (Oliver & McLoughlin, 1999).

Some scholars (Anderson & Ronnvist, 1999; Mioduser, 2006) point out that the number of teachers leading the implementation of the new computerisation is not large and there are few teachers who integrate computerisation into their teaching and learning. In research conducted in 2002 with professional teachers in Ohio and Taiwan (Lu & Mile, 2002), it was demonstrated that irrespective of the teachers' demographic characteristics, all the teachers needed suitable training, after which it could be expected that they would change their traditional teaching methods into computer-integrated teaching methods. Bates (2000) supports this approach, claiming that colleagues should exercise these activities with the staff and not technicians because good educational experience is more important than good technical skill. Similarly,

Rosenblum (2000) argues that when the staff sees effective models that are used by others in their disciplines, in live demonstrations and through virtual tours, they gain new ideas, so that they can create their own on-line courses. Other possible sources for practice are a number of universities and professional organisations, since the teachers need at least one semester of training before creating and teaching their own courses (Paloff & Pratt, 2001; Gabbard et al., 2002). In addition Spektor-Levy, Sonnenschein & Zion (2005) notes that if teachers are more willing to transfer responsibility for the learning to their pupils – they will also be more prepared to integrate the computer within the learning.

Wozney et al. (2006) found that insofar as teachers use the computer and Internet for their own personal needs outside school, they are likely to be the first to use the computer for teaching needs at school while Collins & Hess (2000) also believe that this process of computerisation should be successful with teachers who have a high-level usage of technology.

Computer-mediated distance-learning on the Internet does not necessarily resemble regular teaching in class and suitable pedagogic training is necessary that takes into account the variable of the computer-mediated environment and the special needs of the distance-learner (Gonzalez Kotala, 2009). A computer-mediated learning environment alters the relative importance of the knowledge concepts of teachers. The teachers' content knowledge is constructed and grows out of multiple interactions between the teachers and the learners, between the teachers themselves and by accessing different sources of information. The teacher is not the principle source of knowledge in the class (Hoover, 1996).

Hodgson (1999) indicated that teacher-educators thought it advantageous for student-teachers to have some experience of distance-learning before teaching according to this method. When planning the course they should already practice the management of the course and the delivery system, enabling them to exercise planning, construction and implementation techniques that they

should use in the course. In accord with this view, the University of Florida in cooperation with the Florida Virtual School network, offers student-teachers a specialist course in computer-mediated teaching in the virtual schools. The students who intend to become teachers undergo these specialist courses under the guidance of experienced teachers working in computer-mediated learning environments, in addition to their regular teaching studies (Gonzalez Kotala, 2009).

1.2.1.6 Support for Teacher-Educators Teaching Distance Teaching

The research literature indicates that initial planning should preferably be at the college level, in cooperation and coordination with role partners (Barker & Dickson, 1994; Hiltz & Goldman, 2005; Bonk & Zehang, 2006; Hixon, 2008). This is because the following elements are needed in order to successfully transfer to computer-mediated teaching: an economic foundation, sources of investment, a different computer-appropriate language and culture (Lynch, 2002). All the above-mentioned preparations mean that time is required to plan a computer-mediated course, at least a semester ahead. This time range allows for selection of staff members, definition of their roles and responsibilities (Collins et al., 2002).

Distance-teaching requires more time, more investment, and greater effort from the teacher than traditional teaching (Garrison & Anderson, 2004). The development of an on-line course requires more prior preparation than a face-to-face course because the students are distant from the teacher and from each other, so that the teacher needs to plan well all the variables that create the course (Eastmond et al., 2000). In contrast to a regular lesson, in a computer-mediated course, it is difficult for a teacher to correct the learning materials during the lesson according to a pupil's reaction so the teacher must plan every detail well ahead of time (Carnevale, 2000). Most instructors who deliver on-line courses invest many hours in preparing high quality challenging on-line learning materials and provide feed-back to the students to a greater extent than in face-to-face courses. The flexibility of computer-assisted

courses means that it is continually necessary to challenge the students during the teaching and this has clear implications for the instructors work burden (Lynch, 2002; Rubanks, 2009; Worley & Tesdell, 2009).

There are two main essential components for the integration of the computer in teaching (Allan, 1999). The first component is comprehensive organisational support. The academic institute needs to examine needs, to define policy, to plan resources such as: material means, communication media, development, maintenance and regular support for course sites, unit development that includes graphics-site designers, programmers and site managers, The second component is support for the teachers: development of teaching staffs, supervised by experts. Swift development of distance-learning in higher education institutes, in the last decade, has confronted the heads of academia with a challenge that is not simple, the main question being how to create high-quality teaching and learning that will respond to the needs and requirements of the learners and teachers (Motiwalla & Tello, 2000).

Eighty percent of professors teaching distance-teaching asserted that they suffer from technological difficulties when they teach (Perreault et al., 2002). Studies that have examined the influence of technology on the effectiveness of learning, determine that technological faults constitute one of the most significant obstacles to the success of a computer-mediated course (Buss, 2001). It seems that technical faults have a difficult psychological effect on learners and they reduce confidence during the learning process (Frankola, 2001a, 2001b; Cifunetes & Shih, 2001). Thompson & McGrath (1999) note that the factor that most influences satisfaction of the students during a virtual course is comfortable access. Recently published research findings (Kopkalli-Yanuz & Mutlu, 2009) demonstrated a correlation between the frequency of computerised support and the students' achievements. If the frequency of interaction between students and the computer support system is higher, an improvement appears in the quality of learning and achievements during the course. Technical support is therefore very important for learners using computer-mediated teaching, and technical difficulties should be minimised (Djoudi & Harous, 2001; Killion, 2002). Immediate technical support may

influence the continued participation of the lecturer and/or student in computer-mediated education. Frequent problems may lead to an increase in dropout of on-line learners (Hannafin et al, 1996; Killion, 2002).

Technical support staff fulfils three main roles in distance-teaching (1) support for the teacher-educators with regard to site planning, construction, maintenance and design and (2) providing a response and solutions for all the difficulties and (3) updating for technological innovations (Baker, 2001). Boston (1992) argues that the responsibility for a solution to technical problems lies with the teachers and technical staff. Support should be provided according to demand. Thus the professional level of the technical support staff is very important so that they can assist students with all levels of difficulties. Technical support may be provided by 'search', 'chat', 'e-mail, telephone or in face-to-face dialogue (Bates, 2000, Wallhaus, 2000).

Recent research by Maguire (2009) found that many academic institutes only shape their distance-education policy after the teaching framework is already completed, and without any intensive participation in the preparatory process by staff members. Their study was conducted among academic staff in academic institutions in USA and indicated that staff members are interested in participating in policy making for distance-teaching. Additionally, Wiesenmayer, Kupcynski & Ice (2008) argue that even if lecturers have broad knowledge in their particular disciplines and have high level skills in traditional teaching, they may be unprepared for teaching in a computerised environment.

To summarise, the process of teacher-educators entry into the profession and their training to teach teaching-students differs and is not structured in the same way as the training provided to teachers. Additionally, although teacher-educators understand the need for the transition to distance-teaching they need to undergo a process of change through special training and in their work practices.

1.3 Data Representation and the Communications Media

Technology enables teachers to use of a large range of data representations and communication media that create a new teaching and learning environment. The teleprocessing media revolution has completely altered the importance of knowledge in present-day reality. The concept of knowledge changes its status, instead of expressing ownership it expresses accessibility. What the person knows is not important, but rather to what extent he knows how to reach the necessary knowledge, how to navigate within it and how to be helped by it (Simon, 1982; Harvey, 1989; Harasim, 1993).

One of the advantages of cyberspace reality is the ability to use multiple knowledge representations. Variation of the methods of representation of the studied knowledge enriches the learning material, reinforces the learning experience and enables far more adaptation for a larger variety of learning styles. The use of sources of knowledge allows visual representation and simulation of complex phenomena and this helps learners to understand phenomena, concepts and scientific processes (Edelson, Pea & Gomez, 1996; Moreno and Ortegado-Layne, 2008). Motivation to represent knowledge in different ways, in varied methods, sharpens ability to think about alternative representation, coherence of representation, variation and dynamism (Jonassen, 1996). Ripley (2002) notes that the use of computer applications enables learners to present what they know in different forms.

Additional skills which become cardinal in the Learning 2.0 era are the skills needed to evaluate information sources necessitating that the learner be able to identify different sources of information and to distinguish between them in a clearer manner (Lombardozzi, 2009).

Further information concerning the subject of reading and writing Internet language, communication and tools used in distance-learning: the learning forum, e-mail, graphics and multimedia and representations can be found in Appendix 1E.

To summarise: the integration and use of data tools, communications, reading and writing Internet language and multimedia enable new and different possibilities that were not possible in traditional teaching and learning.

1.4 Interaction

Interaction is one of the most significant components in the learning process in general (Vygotsky, 1938) and it is one of the cornerstones in the on-line learning process in particular (Moore, 1989; Anderson, 2003; Rekkedal & Qvist 2003).

The interaction that occurs in the on-line learning processes through the Internet is a continuous process that allows bi-directional access to knowledge on a number of levels: learner-content; learner-teacher; learner-learner; learner-interface.

There are qualitative differences and different value is attributed to the interaction as a contributor to either formal or informal learning. Thus, any type of interaction must also be assessed according to its contribution to the learning process (Moore, 1989; Hillman et al., 1994; Moore & Kearsley, 1996; Anderson & Garrison, 1998).

The Internet presents great potential as a facilitator and offers the learner new ways of interaction, irrespective of time and location (Trentin, 2002). Students reported that they had more channels of interaction in an on-line course than in the classroom (Harasim, 1987). Garrison and Anderson (2004) emphasises that the success of distance-learning depends on the ability of the instructor to create learning environments that engender motivation for the students to achieve significant advances in their learning and in their creation of products. Additionally, a correct balance and blend of collaborative and personal learning is also a fundamental key for success in a distance-teaching course.

However, two studies that examined the reasons for the poor success of technological integration in teaching in the last decade (Cuban, Kirkpatrick & Peck, 2001; Bonk, Wisner & Lee, 2003) indicated that the main problems concerning on-line learning stem from the difficulty of teaching without any direct contact between the teacher and the learner and with other learners, and the learners' sense of isolation and detachment (Killian, 2002; Lazenby, 2003).

To summarise: interaction flows in multiple channels and ways, contributing, altering and influencing the teaching and learning.

1.5 The Structure of the Israeli Educational System

In many senses, the complexity of Israeli society and its varied human composition are reflected in the state's educational system. The heterogeneity of the education system is expressed in the different layers of the education system and its budget and also in the existence of many types of educational institution adapted to the needs of different sectors of the population. The Israeli education system is commonly described by a division into four main categorisations: by age – education levels; by legal status of the educational institution, by type of supervision and by population sector. The following is a brief explanation of each of these categorisations (Koff, 2002; Vargen and Fidelman, 2009).

1.5.1 Categorisation by Education Level

The Israeli education system is divided into four main education levels or stages, principally according to the learners' ages:

1. Pre-school: crèche – ages 3-4 and compulsory nursery, age 5.
2. Primary school – most commonly Years 1-6, ages 6-11 or Years 1-8, ages 6-13.
3. Middle and Secondary school: middle school - Years 7-9, ages 12-14 and upper school Years 10-12, ages 15-17 or secondary school Years 7-12, ages 12-17 or secondary school Years 9-12, ages 14-17.

4. Higher and academic education: age 18 onwards.

Table 1: Number of Pupils in Israel's State Schools 2008/2009 by education stage (source: Vargen & Fidelman, 2009)

Stage of Education	Number of Pupils
Public nurseries	368,869 (compulsory nurseries:153,379)
Primary education	858,380
Middle school	253,301
Upper/ secondary school	358,429
Total number of pupils in schools (excluding nurseries)	1,470,110
Total number of pupils (including nurseries)	1,838,979
Number of schools	4,017
Number of classes	53,747

1.5.2 Cross-section according to legal status

The legal status of the educational institution is determined according to the ownership of the school and the extent to which the state supervises it.

1. Official schools: state and state-religious schools owned by the state or the local government. The teachers in this sector are mostly state workers.
2. Recognised but not official schools: institutions which are not owned by the state but accept a certain amount of state supervision. They receive less state financial aid than the official schools (75% of the budget per pupil in official schools). Because state supervision is only partial, these

institutions have greater freedom to accept pupils, employ teachers and determine the content of learning programmes. Most of the recognised but not official schools belong to the Ultra-Orthodox Jewish religious movement, especially two large education networks in this sector – the Independent Education Centre and The Bible Education Foundation. However there are schools with this status that belong to other religious communities for example the Arab-Christian schools and not an insignificant number of secular schools such as the Democratic School. They are not considered official schools since they have not been declared as official, although some of them are owned by the local councils or by the state. The teachers in these institutions are not state workers.

3. Exempt institutions – Ultra-orthodox Jewish religious institutions whose chain of schools has been recognised as exempt from fulfilling the general conditions of the education system, so that they do not need to comply with the orders of the Compulsory Education Act (1949). It is noted that this statute provides an exemption to parents of children at the age of compulsory education and not to the education institutions themselves, nevertheless over the years these children which have a certain exemption have become organised within particular institutions so that they are known as the 'Exempt Institutions'. With the acceptance of the Law of Unique Cultural Education Institutions in 2008 by the 17th Knesset a new type of educational institution was formed, in which learners are exempt from compulsory education and their licensing conditions are organised separately.

1.5.3 Cross-section according to Type of Supervision

1. State schools: these are non-religious schools in the Jewish and non-Jewish sectors. State schools and state-religious schools are provided by the state without any affiliation to a political, ethnic or other body and are under the full supervision of the Minister of Education.

2. State-religious schools: Jewish-Zionist religious educational institutes. This is state education in institutions that conduct a religious life-style and learning programme, directed by them, and the teachers and supervisors are all religious.
3. 'Other' supervised schools: these are ultra-orthodox education institutions including non-official schools; however they are divided into those institutions which belong to the large ultra-orthodox education networks and other institutions outside these two networks.

1.5.4 Sector Cross-section

1. Jewish
2. Non-Jewish: Arab, Bedouin, Druze and Circassian

Table 2: Number of Pupils 2008/2009 by legal status, type of supervision and sector (Vargen & Fidelman, 2009)

Number of pupils in schools, primary schooling only, by legal status 2008/2009

Legal Status	Official	Recognised but not Official	Exempt	Total
Number of Pupils	694,134	164,167	45,079	858,380
Percentage of Total	76%	19%	5%	100%

**Table 3: Number of Pupils in all Schools, by Type of Supervision
2008/2009**

Type of Supervision	State	State-Religious	Other (Ultra-Orthodox)	Total
Number of Pupils	1,040,660	200,643	228,807	1,470,110
Percentage of Total Pupils	71%	14%	15%	100%

Table 4: Number of Pupils in all Schools, by Sector 2008/2009
(source: Vargen and Fidelman, 2009)

Sector	Jewish	Non-Jewish				Total
		Arab	Bedouin	Druze	Circassian	
Number of Pupils	1,080,056	281,392	75,119	33,402	141	1,470,110
Percentage of Total Pupils	73%	19%	5%	2%	0.01%	100%

1.5.5 Number of Pupils in a Class in Primary and Upper Schools

(source: Vargen and Fidelman, 2009)

The maximum number of pupils allowed in a class for Years 1-12 in the Israeli education system is 40 and the maximum number of pupils in a nursery class is 35. The regulations concerning this matter are not determined by law, but by managerial directives from the Ministry of Education. In comparison to the maximum number of pupils in classes in Western states, the Israeli classes are very overcrowded. The report of the OECD published in 2008 (*Education at a Glance*) shows that the average number of pupils in an Israeli primary school, class is 27.5 in comparison to an average of less than 21.5 in OECD member

states. In Israeli middle schools the average number of pupils per class is 32.8 in comparison with an average of 24 in the OECD states.

1.5.6 Education Staff

One of the problems facing the Israeli education system in recent years has been the anticipated lack of teachers (Vargen and Fidelman, 2009). According to the forecast of Israel's Central Bureau of Statistics (CBS) for the year 2013 there will be a deficit of more than 10,500 teachers throughout the education system (CBS, 2008). There are several reasons for the expected shortage, including the aging of the present teaching force; burnout of teachers due to internal processes in Israeli society (including an increase in the level of school violence in general and especially towards teachers), low wages that deter future teaching students and university graduates from joining the teaching profession, dropout of young teachers from the profession (*inter alia* because of the increase in teachers' level of education in correlation with the low wages in the teaching profession).

1.5.7 Teacher's Wages

From the OECD Education Report for 2008 it appears that teachers' wages in Israel are far lower than the wages of teachers in the other Western countries reviewed in the report. The Israeli teacher's wage, considered in relation to the Gross Domestic Product per person (in terms of buying power), is one of the lowest in the world. It is far lower than the average wages in the OECD countries (approximately 39% less) and the gap between the Israeli teacher's wages and those in leading Western states is enormous. Moreover, this gap is even larger when considering the wages of teachers with 15 years and more experience (approximately 49% less in Israel). The wages of teachers who work for the state are also lower than those of other academically qualified state workers (Vargen & Fidelman, 2009).

1.6 The Development of Higher Education in Israel

The foundations of higher education in Israel were constructed during the 1920s when the Technion (founded 1924) and the Hebrew University (founded 1925) opened their gates. In 1948 with the establishment of the State of Israel, there were only two universities (see: Council for Higher Education Internet site. *The Higher Education System in Israel*. Available at <http://www.che.org.il/template/default.aspx?PageId=160>). A rapid increase in population and other socio-economic developments have led to a growing demand for access to higher education in Israel.

The consequent growth process of higher education has been achieved in three significant stages (Kirsch, 2010).

1. The first stage, beginning from the end of the 1950s and until the beginning of the 1990s. At this stage there was a transition from a monolithic-elitist system that only included the universities to a pluralistic-binary system, including significant expansion of the number of students and the percentage of learners in each year group. As a result during the 1950s and 1960s five new universities were established: Ben Gurion University of the Negev, the Bar Ilan University, Tel Aviv University, the University of Haifa and the Weizmann Science Institute. From the beginning of the 1970s an additional stage of development and variation of the higher education system began. The Open University began its activities and gradually developed and expanded these activities throughout Israel, and from the end of this decade education underwent a process of professionalization and academization with the upgrading of teacher-training colleges into academic institutes for higher education.
2. The second stage lasted from the 1990s until the beginning of the 21st century. During this period the number of higher education institutions grew from 23 in 1992 to 53 in 2002. The increase in the number of colleges and the fact that they were not financed as research institutes, enabled funds to be diverted to an increase in the number of students from 90,000 to approximately 181,000 in 2002. This change stemmed

from Amendment 10 to the Council for Higher Education Law that allowed different academic colleges to be established: general colleges, technological college and professional (disciplinary) colleges. *Inter alia*, the innovation was expressed by the fact that many of the general colleges and the professional colleges were not funded by public funds, meaning that they were not financed by any government or state entity.

3. The third stage began from the early years of the second millennium. This stage began with the discovery of blocks to higher education entry and consolidation of a support programme to improve accessibility to higher education. This necessitated the removal of blocks for the Ultra-Orthodox and Arab populations and also the removal of obstacles that restricted the movement of students between the different types of educational institution. In 2008 the number of students was approximately 22,000, an unprecedented increase of three times the number twenty years earlier. In that year (see: Council for Higher Education. 2009. *Principle developments in the Israeli higher education system: Selected Data*.) there were 63 higher education institutions in Israel, including 7 universities, 19 academic colleges funded by the Higher Education Council's Committee for Planning and Budgeting, 10 private academic colleges which are not funded by the Committee for Planning and Budgeting and 26 teacher-training colleges, in which a total of 220,470 students studied. In addition 44,330 students studied within the framework of the Open University.

1.7 The Research Issue

In this context a training teacher-educators is an issue that has not yet been solved. There is no organised pre-structured training and the entry into the role is often too hasty. In cases where there is training, the focus and direction have been to train the teacher for a K-12 (traditional primary and secondary school) education system. Additionally, approximately a third of the teacher-educators begin this role without any pedagogic training. During recent years,

computer use has become an essential life skill without any organised preparation or guidance, this is especially so with regard to the introduction of technology into the education system and integration of the computer in teaching and learning. The assimilation of computer skills in the individual's life and as part of the teaching and learning environment is a component in all learning institutions from the nursery till adult learning in a broad range of learning settings and in life-long learning. This trend will deepen in the future and become a central foundation for any teacher training. New skills are required including: organisation of information, different organisation and management of teaching and learning and creation of a weave of connections as part of the interaction between all participants in the learning process. All these elements have led to change, and engender the creation of a new teaching mode for the teacher-educator who teaches in distance-teaching without any prior preparation and without any role definition in general or consideration of methods of teaching for specific disciplines in particular.

1.8 The Research Questions

The research questions are:

1. What are the common characteristics of all the teacher-educators concerning their transition to distance-teaching?
2. How did the teacher-educators harness technology for the organisation of information?
3. How did the teacher-educators harness technology for the organisation and management of distance-teaching?
4. How did the teacher-educators harness technology for different types of interaction?

Chapter 2: Theoretical Perspectives

2.1 Teacher-Training Approaches in an Era of Change

Zeichner (1983) developed a conceptualisation of teacher-training that related to the following types of paradigm:

The Traditional Paradigm (Teaching as a traditional craft)

Teacher-training is perceived as a period of apprenticeship. According to this approach that sees teaching as a craft, professional teaching knowledge is seen as something that is accumulated mainly by the teacher's 'trial and error', and primarily exists in the acts and wisdom of experienced teachers. The personal characteristics and skills of the apprentice have just as much influence as the training on the apprentice's professional future. It is only the combination of high-quality training with suitable personal characteristics that will determine whether the apprentice will one day produce routine performance or become a creative professional. The traditional paradigm is in line with the practical orientation suggested by Feiman-Nemser (1990a; 1990b). This approach was replaced over time by the behaviourist approach.

The Behaviourist Paradigm

This paradigm is based on positivist philosophy and psychology. The teacher's requisite knowledge and skills are relevant and specific to the teaching role and should therefore determine the teacher's training. The criteria for assessment of success should be transparent and clear, and the teacher's skills can be assessed as a valid measurement according to the level of mastery in teaching performance, its defined skills and expertise. The teacher of the future is perceived as a passive consumer of professional knowledge who has a minor part in decisions concerning the content and direction of the programme in which the teacher participates. Training methods for this paradigm are mainly practice and exercise.

The Personal Paradigm

This paradigm relies on the epistemological-phenomenological approach and on developmental psychology. It is linked to 'Humanist Teacher-training' and has an affinity with open education. According to this paradigm, training contents should be founded on the learners' needs which the learners are supposed to discover for themselves. Hovering over this approach is the spirit of the existentialist school of psychology, indicating a perception that teacher-training is some sort of process leading to mental maturation, seen here as re-conditioning the teacher's successful functioning. According to the personal paradigm, the success of training is measured by the power and quality of the teacher's influence on the individual pupil's development. The personal paradigm described by Zeichner (1983) is equivalent to the personal orientation proposed later by Feiman-Nemser (1990a; 1990b) that highlights the teacher's personality. This view sees teaching as something spontaneous that is not learnt but is founded on elements of the teacher's personality which are essential for the work. Teacher-training according to this approach separates learning and study from the content and concentrates on the fostering of the student-teachers personality, their personal development and their self-awareness. It focuses on the student-teachers' inner world and their interpersonal communication. Teacher-training according to this orientation enables future teachers to relate properly to their personal 'self' and to the 'self' of their pupils. Supporters of this approach prefer studies in which learning stems from the pupils' needs and from their personal interests and knowledge is derived from personal investigation and discovery.

Training Paradigm focused on Research

This type of training should take place in an atmosphere that creates a critical-investigative approach, fostering skills that enable its realisation. According to this approach the need for professional learning skills is highlighted as a means to reach the desired goals, but not as the goals of the training. The main desired goal is the correctness of the teacher's criticism, firstly when identifying the problems encountered and then to cope with them with the available means. Professional skills and all other behaviours of the teacher constitute

tools with which to cultivate the critical approach. According to this approach, the trainee-teacher becomes an active agent of the training, gradually, through personal effort, throwing off the chains of prejudices, superficial impressions, and unsubstantiated norms. The teacher should embrace a critical approach and willingness to investigate each problem that does not have a solution or whose accepted solution is unacceptable to the teacher. To do this, the trainee-teacher should demonstrate openness and willingness to critically investigate and research the educational act. This paradigm corresponds to the technical orientation described by Feiman-Nemser (1990a; 1990b) that sees teaching as a process of problem-solving and decision-making.

As noted, Feiman-Nemser (1990a; 1990b) defined the term 'teacher-training orientation' as a complex concept, describing the goals of teacher-training and the means to achieve them. She distinguished five types of teacher-training orientation: practical, personal and technical, that corresponded to the paradigms proposed by Zeichner (1983) and two additional orientations:

The Academic Orientation

This underlines the importance of subject matter and focuses on the transfer of a body of knowledge and the development of understanding. This orientation sees teaching as a process that has an academic source and the teacher as an intellectual guide. The teacher's work is seen as conditioned by the teacher's sources of knowledge and thus it is sufficient if the teacher is well-educated, to be able to teach. The goals of training according to this approach are typically intellectual.

The Critical/Social Orientation

This orientation founded on radical theory, integrates political and educational activity, combining teaching and learning with the creation of a new social order. According to this approach the teacher is seen as a critical intellectual with social commitment, whose role is to advance the goals of democracy, to act for social equality and justice and to take a central part in the development of social order.

This approach sees the school's goals as fostering political citizenship expressed in people's ability to think critically, to realise their social responsibility and to be willing to struggle for the implementation of social values in public life, in the spirit of concern for justice, happiness and equality. During recent decades there has been a development in teaching approaches and a transition from the focus on teacher-characteristics to focus on teacher-behaviours. More recently teachers have begun to be seen as decision-makers and reflective practitioners. Teacher training has reacted to this last transformation by altering the objective of teachers' training programmes from the acquisition of skills to the acquisition of knowledge and reflection. Grossman, Hammerness & McDonald (2009) indicate that training programmes should change so that they will be organised around core-practices, including knowledge, qualification and professional identity that develop through a process of professional learning. They suggest that the training programme should be organised around these core-practices, i.e. revolving on the practical facet of the training. This means that teacher-educators must develop new approaches to training, within which the teacher-educators should foster their roles as pedagogic guides in order to provide skilled feedback and create trust to enable the trainee teachers to improve their understanding and performance.

2.1.1 Teacher educators: identities, sub-identities and the implications for professional development

New teacher educators entering teacher training face four basic problems: a clash between concepts and ideals, lack of time, lack of resources and the complexity of their work (Swennen et al., 2008). They also experience a sense of isolation in their work (Zeichner, 2005), feel that they have a large work burden and find difficulty coping with the social complexity involved in a complex context and the fact that a large number of stakeholders are involved in the processes (for example: students, trainee teachers, pupils, colleagues etc.) Swennen, Cooper & Shagrir (2008) found that the training institutions did not support the development of teacher-educator's professional identity as teacher-educators; meaning that they were provided with no formal absorption

process into the profession over their inaugural years and they were left with a sense of difficulty and isolation.

Swennen, Jones & Volman (2010) assert that teacher training is perceived as a process that begins with initial training and continues until the professional development activities begin following the completion of training. Cultural and political contexts of each state are expressed in teacher-educators' professional development and also influence their sub-identities, while there are also common denominators for all teacher-educators wherever they might be.

2.2 Teachers' Professional Knowledge

Teachers' professional knowledge is acquired from different sources and constructed from different types of knowledge. Shulman (1986a; 1987) suggested the following division of the components of teachers' knowledge: (1) Knowledge of subject-matter: understanding facts, concepts, structures and principles in the area, organising them and the connections between them. (2) Knowledge in other content areas: teachers also use knowledge from other content areas in the lessons. (3) Knowledge relating to connections, and the framework (knowledge of curriculum): recognising the systems within which the teacher functions: the school, community, country, familiarity with the pupils' families, familiarity with and understanding of the learning programmes and learning materials that exist for the teaching of a particular subject at a particular level. (4) General Pedagogical Knowledge, knowledge of the pedagogic principles and techniques of effective teaching which is not limited to the specific area of content. (5) Pedagogical Content Knowledge: knowledge concerning the pupils' learning difficulty in relation to particular material and knowledge of teaching methods relating to specific subjects in the content area to facilitate the pupils' learning. (6) Knowledge of educational aims: understanding the goals of teaching in the course, in the department or in the setting in which the academic degree is studied. (7) Knowledge regarding the learners: knowledge regarding the pupils' characteristics, previous background, life experience, capabilities, motivation and learning styles.

'Knowledge in action' which is accumulated by professional teachers is not always revealed. The teachers' actions testify to their possession of the knowledge but they are not able to express this verbally, similar to other professionals who have difficulty in expressing their special knowledge so that this body of knowledge is sometimes called the teachers' 'implicit theories', and unconventional means need to be used to reveal them (Schon, 1983). Research literature indicates two additional types of knowledge which constitute personal knowledge for each teacher:

(1) Knowledge of skills and professional knowledge (Craft Knowledge) also known as Practical Knowledge. This is a combination of previous types of knowledge synthesised by each teacher on the basis of the experience acquired during years of practical work (Elbaz, 1983; Connely & Clandinin, 1984). This knowledge develops for the teachers from complete ignorance to teaching practice wisdom (Wilson & Daviss, 1994) as a result of reflection on their work in class and problem-solving that they experience during their work. Since a large part of the teacher's work is carried out in isolation, it is usually not expressed verbally or in writing and is not transmitted from one teacher to another. It is personal knowledge that differs from teacher to teacher and usually remains hidden and does not surface to consciousness. (2) Knowledge of Self: this includes the teachers' awareness of their own principles and values, their approach to education and their goals in education, their teaching style, personal characteristics and the strong and weak aspects of their teaching. Teachers develop their self knowledge through an analysis of their practical work, conducting reflection on their work and an assessment of the effectiveness of the teaching (Applegate, 1989; Kagan, 1990; Schon, 1988; Vonk, 1995). In order to develop their self assessment the teachers need to know how to continually receive feedback from their pupils regarding the pupils' opinions of their teaching and what they understand and to consider whether it is necessary to reprocess learning programmes and improve their teaching (Grossman, 1995). Teachers use their personal knowledge in order to take

care of problems while they are teaching, in order to think about and reflect upon their teaching (Elbaz, 1983).

Reflective teaching' contradicts the culture that supports the use of set lesson programmes, examinations and teaching that encourages a system of 'correct answers' that the teacher needs to manage to teach and the pupils need to learn (Paris & Winograd, 1990; Schon, 1988; Dart & Clarke, 1991; Bernt & Bugbee, 1993; Buttler & Winne, 1995; McCrindle & Christensen, 1995; Newby & Ertmer, 1996; Gabbard et al, 2002).

If the teacher has a more detailed reservoir of knowledge and a larger reservoir of behaviours, it can be expected that the teacher's expertise will grow and the teacher can teach with greater flexibility and effectiveness (McDaniel, 1982). Nir & Bogler (2008) found that teachers think it important that professional development be properly and appropriately connected to their teaching needs in the classroom and that they should be able to influence the directions in which their professional development is shaped according to their needs and expectations in the school.

Koehler & Mishra (2009) recently related to the development of teachers' professional knowledge regarding computerised pedagogy. They refer to an integrated area of knowledge corresponding to Shulman's (1987b) concept of Pedagogical Content Knowledge (PCK) to which specialist knowledge in the computerisation field is added. They explain the interaction, balance and reciprocal relations between the different areas of knowledge that compose the TPACK (Shulman, 1986b; 1987a): knowledge, pedagogy and computerisation. The correct combinations of interaction between these substantive components create teachers' pedagogic flexibility in the implementation of computerisation in teaching (Mishra & Koehler, 2006; Koehler & Mishra, 2008).

In many cases the teacher-educators that go on to teach at college accomplish the transition from novice to expert (Kolb, 1984; Bruner, 1996; Sternberg, 1997). The classic studies by Dreyfus & Dreyfus (1986) proposed a model of progression through five stages from being a novice to becoming an expert:

- Novice – complies strictly with teaching rules
- Advanced beginner – complies with greater flexibility to teaching rules
- Competent/ performer – able to produce programmes
- Skilled performer – has much experience, understands what are the most important factors in a given situation and can make decisions, with flexibility based on the given situational factors
- Expert – is able to act intuitively, without relying on the rules and without having to repeatedly deliberate about the actions.

Progress from stage to stage and from skill to skill is performed according to a hierarchic progression and at each stage the content of the next stage is learnt until it is achieved. What then are the outstanding differences between a novice and an expert? Sternberg (1997) claims that specialisation should be perceived according to a multidimensional prototype, at different levels, which includes: advanced ability for problem-solving, rich knowledge in the area, advanced ability to organise the relevant information, ability to use the information effectively, creative ability expressed in the creation of new knowledge based on extant knowledge, automatic action, practical ability expressed by knowing how to progress in the area of specialisation

The dimensions/ characteristics of the prototype 'expert' described above are likely to change over time and in different locations, in other words in different socio-cultural situations or in different specialist areas. Expertise, in the opinion of Sternberg (1997) is to a large extent, ranked according to and specific to the area in which it exists.

Shiloni (1991) reviewed a variety of research studies in this area and described the way in which they viewed the differences between novices and experts in education, according to four different dimensions: the knowledge base,

organisation of the knowledge, representation of the knowledge and problem-solving strategies. She noted that experts have a broader knowledge base including both 'what' knowledge i.e., the areas that the teacher teaches, and also 'how' knowledge, the teaching methods and management of the class. Experts' knowledge is more highly organised than that of the novices, since in parallel to the empowerment of their knowledge, they develop and become more efficient, often covertly and peripherally and sometimes in a conscious and obvious manner, processing and organising the professional knowledge. A broader knowledge base enables the creation of connections and improved understanding of causation. As the knowledge base and its organisation improve and become empowered, the knowledge representations become clearer. Experts have clearer images of what should be desirable and undesirable dynamics in the classroom. A broader knowledge base that is better organised enables the use of more data from experience that are elicited faster when the teacher deals with problem-solving. An expert is able to find more ways to solve professional problems and even to implement them in a more effective manner, (Fennema & Loef Franke, 1992; Shiloni, 1991).

To summarise: teacher-training has undergone many changes that have engendered alterations in the training programmes. However the entry process for teacher-educators is not uniform and there is no clear path of preparation and training for their role. In addition, teacher-educators who transfer to work in teacher-training institutions often begin as 'novices'.

Tapscott & Williams (2010) claim that the universities are losing their grip on higher education, while the Internet is becoming the dominant source of knowledge, both as a data reservoir and also as a global interface for knowledge sharing between learners. The higher education model demanded by a new generation of students is very different from typical university teaching and this fact means that higher education needs to revitalise teaching and learning processes to fit the spirit of the new era. Tapscott & Williams (ibid) believe that the universities can only survive and flourish in the networked

global economy if they develop and adopt collaborative learning and production of knowledge.

To summarise: teacher-training is founded on different paradigms and orientations, and the sources of teachers' knowledge and the uses they make of this knowledge are not uniform.

2.3 Introducing Change

The teachers' transition to distance-teaching was a type of change that they were asked to make or made on their own initiative. Researchers studying change processes have indicated that team work and cooperation between teachers are one of the most important sources for successful change (Fullan & Steigelbauer, 1991; Fuchs & Hertz-Lazarovitch, 1992; Fullan, 1993). Soter (1993) claims that the lack of a supportive environment, in which it is possible to experience and implement the change or a supportive environment that applies the desired change is one of the reasons for non-internalisation and lack of acceptance and performance of innovations.

First, in order to succeed in the implementation of change, the change should be perceived as a necessary action (Fullan, 1990; 2001). Fuchs notes that the change process is usually vague and painful causing a sense of lack of control in a situation where the individual's fate is controlled by others. Over time the individuals involved undergo change, gaining confidence and changing their view of the change. Change should be performed gradually and not simultaneously in multiple factors (Wickstrom, 2003). Long-term effects that are created gradually and usually in an imperceptible manner are more stable and resistant to attempts to change them than short-term effects (Salomon, 2000).

Understanding the difficulties involved in introducing change may provide a response to the difficulty of introducing technology into the education system; integrating the computer in teaching and learning, and the transition to distance-teaching and change in the role that the teacher-educator needs to undergo. Strike & Posner (1983) indicate that the process of cognitive change involves both rational (cognitive) and irrational factors. In their theory of

conceptual discourse theory they focus on four conditions, which in their opinion enable successful change of significant perceptions and transition from existing beliefs to new beliefs:

- Dissatisfaction with existing beliefs, since these beliefs do not function properly;
- The appearance of a new intelligible notion that appears logical in the individual's view and encourages the individual to begin to investigate it and to consider accepting it instead of the belief that functions defectively;
- Plausibility: a new perception should be able to compete against the existing perception with which it contends, meaning it should have the potential to solve problems connected with other established beliefs.
- Fruitfulness – a new notion must be 'a productive tool of thought' and to suggest new directions for research.

These conditions are part of a complex environmental system that contains a network of factors (cognitive, affective, motivational etc.) that influence the individual's perceptions and willingness to change.

In any change process it is possible to identify a number of characteristics. Recognising these characteristics, understanding their implications for the process and for the participants in the process and accepting them may facilitate the introduction of the change (Fuchs, 1995). A change process is dynamic, it is consistent and cyclic, it moves in cycles: from application, operation, creativity and enthusiasm to pressure, a sense of suffocation and insecurity. A change process takes place in three areas: cognitive, emotional and behavioural, meaning: in this process what people think, feel and do with regard to the process are significant. The change process is complex and multidimensional. This complexity engenders uncertainty for the organisational aspect of the change process and may cause confusion, a sense of vagueness and lack of orientation among those participating in the process (Allen, 1992).

Many researchers (Hall & Hord, 1987; Fullan, 2001; Eraut, 1995) have explained that the penetration of change processes involves the teachers' thinking and action, the teachers' self-understanding, the system's understanding of the teachers' world and the teachers' professional development.

Jackson (1992) drew a distinction between a professional change and teachers' professional development. He asserts that each teacher changes with time (just like any other person) but not every change is a change that testifies to development, and certainly not to professional development. Jackson suggests four ways to help teachers to develop professionally:

- The 'way of know-how', guidance and advice to improve their teaching methods
- Improvement of work conditions,
- 'Way of independence'. Increasing the teachers' autonomy in areas connected with their work.
- 'Way of role accommodation'. Reducing the psychological pressure stemming from the difficult demands of teaching work. Deepening understanding, seeing things beyond ordinary vision, broadening horizons.

Fullan (1990; 2001) indicates that change in education systems acts on three dimensions: change in materials and contents, change in approaches and teaching methods and changes in beliefs and attitudes. The easiest and most prevalent but also the most superficial is the change in materials and contents, in contrast the change that is most painful is the change in attitudes and beliefs since it demands change from within. He adds that true change represents serious personal and collective experiences characterised by vagueness, yet when change succeeds it gives a sense of control, achievement and personal growth.

Fullan, 2001, Mitchell, 1994 and Eylon & Bango, 1997 asserted that it is impossible to force teachers educational institutions to undergo a true change from outside, with a 'top-down' approach, and that the success of a process that introduces changes into an educational system depends on the performers themselves, i.e. the teachers. In order to create a true change a continuous interaction must take place between changes in perceptions and changes in attitudes, beliefs and behaviours.

To summarise: the introduction of change is a complex process constructed in stages and involving different options. It stems from various motives and is composed of different elements. Not all changes lead to professional development.

2.4 Teaching and Learning

2.4.1 The Teacher's Role in Distance-Teaching

The traditional role of teachers is to establish a climate or culture, social presence, respect and understanding (Royse 2001), so that similarly for distance-teachers it is important to provide a 'virtual climate' in Internet-based courses to communicate their computer-mediated presence and to choose formats tailored to the abilities of the students (Schweizer, 1999). The expectation is that the teacher will become an e-personality with a more dynamic approach and will offer more personal support in on-line courses and not just technology or reference to an on-line files library (Chepya, 2005). In addition the teacher should provide activities of different types for cognitive activation of the students, expressed by thinking activities (Newton, 2000). Teachers should sometimes relax their control and enrich the computer-mediated environment with challenges, original contents and projects (Schrader, 2008). One of the recommended models for active instruction is that proposed by Salmon (2002) composed of the following stages:

1. Motivation and Access: At this stage the instructor should provide support and ignite the learner's motivation so that the learner can

overcome the first stage of becoming familiar with the new system and getting to know new people on the net.

2. Socialisation: social acquaintance between the participants. The role of the instructor is to help participants to communicate, at first on a social basis forming the communication that will continue throughout the course.

The next three stages are critical from the aspect of the learners' cognitive learning development:

3. Information Exchange: At this stage a learning process takes place and the participants exchange ideas and opinions and contents relevant for the course. The learners search for the necessary knowledge and use the provided learning materials to perform tasks. The role of the instructor is to provide stimuli that will generate the learning process on which the tasks are imposed.
4. Knowledge Construction: a more cooperative interaction forms between the learners in the group. High-order thinking processes develop and knowledge is constructed. The effectiveness of communication depends on the extent to which a common understanding is produced. At this stage the instructor must allow participants to be active and take responsibility for the development of the learning process.
5. Development: at this stage participants summarise their understandings regarding the discussed subject and there are calls for reflection on the teaching/ learning process that has taken place. The instructor's role is to train the participants in the development of higher-order thinking skills such as critical thinking.

In a study conducted by DiPietro et al. (2008) concerning virtual secondary school teachers in the USA (Michigan Virtual School) it was found that the teacher who teaches in a virtual school needs completely different talents and skills from a teacher teaching in a face-to-face classroom. The virtual teacher needs to cope simultaneously with the changing technology and with the changing learning contents. Because of the amount of information on the Internet the teacher cannot adhere to the textbook, but needs to learn more

dynamically by renewing and up-dating contents continually. The virtual teacher needs to present contents in far more varied ways, from interesting and relevant Internet texts to video-films that challenge the students. The virtual teacher must also be curious and have a good ability for self-learning. It also transpires that although the virtual teacher does not need to cope with classroom discipline, there is a need to constantly ascertain that the organisation of learning works as necessary and that the on-line pupils do enter the on-line lesson at the necessary times and participate in on-line forums as necessary and to the extent required. The on-line teacher needs to know how to organise the learners in study groups and to instruct them dynamically for their collaborative work since most learners do not know how to learn in a group. The teacher needs to be far more organised with regard to the lesson layout and its contents since it is impossible to improvise in an on-line lesson and the procedure of the lesson must be set out in the best possible way especially with regard to the planning of challenging questions and dilemmas on the forums. The virtual teacher also needs to have intuition in order to sense when the learners need additional guidance and assistance, despite the computerised environment within which the teacher cannot usually see the learners face-to-face. The teacher must therefore continually ask directed questions and independently analyse the answers in order to understand where the problem lies and whether the learner has 'got lost' in the Internet space. However, a recently published study (Reynard, 2009) shows that integration of the fields of computerisation and the Internet in learning did not necessarily lead to the development of many more creative and challenging learning tasks in comparison to those created in the non-Internet past. In this context, Nachmias and Ram (2009) note that exploitation of the potential embodied in the net for university students' learning needs depends to a large extent on the course instructor's abilities.

This means that although the computer is a lever for change, the operation of this lever is guided by non-technological considerations, so that the role of the teacher is important (Salomon, 2000). Not all on-line teaching is of the same quality, although technology may improve the support by providing additional

content (Killian, 1999). Just as trucks delivering food do not influence our diet, so in virtual teaching what is important is what the teacher does with the technology and not the technology itself (Clark, 1983) Thus teachers should be encouraged to combine knowledge with technology that they know (Recesso, 2002).

Finally, it is noted that technology cannot offer recipes to turn the novice teacher into an expert (Glaser, 1990) and that those 'who hasten to adopt innovations' need to be aware of the huge and varied amount of technologies offered in order to effectively identify those that are most appropriate, and then to lead the process for their assimilation in their educational institutions (Gillard Bailey & Nolan, 2008).

2.4.2 Constructivism

In the 1990s, a change took place in the learning-teaching-assessment paradigm of teaching (Shepard, 2000). Instead of the transmission of knowledge approach, more constructivist theories of learning were adopted by shaping knowledge and developing understanding in a social context. Learning is defined as providing meaning by linking the new to the old. As a result teacher-trainers, teachers and student-teachers now focus on the development and empowerment of capabilities that will advance learning in more complex situations than the mere transmission of knowledge (Richardson, 1997).

According to constructivist philosophy, knowledge is found in a process of construction and not necessarily in teachers. The constructivist approach is based on the theory of Piaget (1970). It focuses on the structuring of knowledge as a personal process (Driver et al., 1994). According to this viewpoint constructing meaning is an active process that the individual performs within a reciprocal consideration with the physical world in order to create a coherent world picture. In other words, to avoid a situation of internal contradiction between experiences in the physical world and the individual's mental structures (lack of equilibrium in Piaget's terms), a conceptual, cognitive

re-organisation (accommodation) takes place within the individual. Learning is therefore self-organisation that takes place in the learner's mind (Cobb, 1994).

The socio-cultural approach that stems from the theory of Vygotsky (1978) focuses on the structuring of knowledge as a social process. Knowledge according to this approach is symbolic in nature, thus, beyond the reciprocal relations with a physical reality, the individual conducts reciprocal relations with symbolic realities. Learning is therefore a process of socialisation to different communities and their 'discourse' (Driver et al., 1994). The individual is exposed to the common-sense of the community in which the individual lives, represented especially by its everyday parlance, and to its scientific culture and its language (Phillips, 1995).

Despite the differences between them, both these approaches represent the progressive approach, according to which the individual is not a passive absorber of knowledge, rather the individual is required to act and experience the environment and to reflect on thinking processes in order to achieve understanding (Phillips, 1995). Based on this common denominator, several approaches have developed today that adopt a combined viewpoint, that attributes equal importance to the two dimensions – personal organisation and social conditions (Cobb, 1994).

According to Brooks & Brooks (1993) constructivist pedagogy is constructed on five principles:

1. Raising problems that are primarily relevant for pupils.
2. Structuring the learning around 'large ideas' or 'basic concepts'.
3. Requesting and attributing value to the pupils' viewpoint.
4. Adapting the learning programmes so that they relate to the pupils' assumptions.
5. Assessing the learning in the learning context.

Turner & Dipinto (1992) emphasise that the constructivist approach to learning is best realised when the learning is a process of construction and shaping and the learning takes place especially when the learner constructs a concrete product, that can be achieved collaboratively with others. Jacobson & Spiro (1995) set out five basic constructivist principles relating to learning:

1. Ensuring multiple conceptual/knowledge representation of complex knowledge, in different ways, from a variety of viewpoints and in different contexts and activities.
2. Linking abstract and complex concepts to a variety of authentic examples (knowledge in use), in flexible inter-domain knowledge structures (Ill-structured domains/ content areas).
3. Presentation of the complexity of domains and concepts, beginning with the initial stages of learning. Simplification of complex knowledge prevents deepening and constructing knowledge.
4. Emphasising links and the netted structure of knowledge, in different, rich and flexible contexts.
5. The relationship between existing knowledge and new knowledge is considered important using renewed assessment and construction of knowledge, by continual assembly of knowledge structures, avoiding memorisation and learning in order to remember.

The role of the on-line teacher who acts according to a constructivist approach varies from a status of 'sage on the stage', the endower of knowledge who provides the teaching as a guide, partner and mediator in the learning process, to the 'guide on the side', who enables the learners to examine their knowledge and their own understanding (Hoover, 1996). The on-line teacher also constitutes a significant factor in the development of three components of learner control: autonomy, strength and support, and in creating equilibrium between the learners. This role has two aspects: the first, encouraging learners to cooperate and increasing their motivation for learning. The second: use of a methodical didactic path, chosen by the teacher to present the learning materials (Garrison & Baynton, 1987; Jonassen et al., 1995; Carnevale, 2001).

However, Hult et al. (2005) warns that the teacher in an on-line course cannot seek refuge in constructivism leaving the dynamics to the pupils because dynamics do not autonomously come into being, unless the teacher motivates them intentionally.

In the interaction of the discussion group, open to all participants, the teacher who employs a constructivist approach serves as a mediator between the studied material and the learner through questions and an open discussion. The teacher encourages the learners to take the initiative, to cooperate and to mutually enrich each other, by creating an open and supportive atmosphere using frequent positive feedback that constitutes one of the learning parameters for the learners' satisfaction (Resnick, 1987; Bendar, Cunningham, Duffy & Perry., 1992; Coomey & Stephenson, 2001).

According to LaMonica (2001) a teacher who wishes to create a constructivist atmosphere using a computer-mediated learning strategy should consider the following aspects (LaMonica, 2001):

1. Encouragement of learners' autonomy and initiative and creation of an active sharing atmosphere in the discussion group or through electronic mail.
2. Access to varied sources and use of different types of information, also interactive links as part of the learning materials, and additionally multifarious representation of learning materials.
3. Clear drafting of high cognitive level tasks such as: characterising, analysing, predicting, reconstructing and also asking open questions. The learner should know what the tasks are in advance and the terms of the learning timetable.
4. Encouraging learners to create a dialogue with the teacher and with colleagues in the discussion group to enable social relations to form to enrich the learnt contents.
5. Providing an opportunity for learners to relate to their colleagues' questions without interference by the teacher.
6. Providing frequent guidance and feedback.

2.4.3 Teacher-focused Teaching

Teachers who place themselves at the centre of the teaching process see the main part of their role as the transmission of knowledge. They concentrate on provision of teaching and what they teach. This style influences the organisation, structure and presentation of the course (Lindblom-Ylänne et al., 2006).

Withall (1985) notes a number of attributes of teacher-focused teaching in the class: the teacher determines the material transmitted in each lesson and that some lessons constitute larger units and ensures the organisation and sequence of this material. During the teaching, the teacher is most of the time in a face-to-face situation with the class. The teacher relates to, demonstrates, illustrates, reads, and teaches the material. The teacher may also write on the board, use a slideshow or a computer presentation on a large screen. Usually the teacher combines these excerpts from a 'one-man show' with participation and activation of the pupils by asking the pupils questions and listening to their questions, conducting discussions and providing time for the pupils' individual or group work.

According to Panitz (2000) when the pupils work in groups, the teacher determines the material for their work, who will sit in which group and how much time the group has to complete the task. Cuban (1984) adds different aspects of teacher-focused teaching:

1. The teacher speaks more than the pupils during the teaching.
2. The teaching usually takes place in plenum with the whole class. Work in small groups or individually is rare.
3. Use of time in class and teaching rate are determined by the teacher.
4. The class is arranged in rows of tables or chairs facing the blackboard with the teacher's table between them.
5. There are sometimes discussions with pupils and guided individual work.

The teacher's image in such a class is as an 'executive' responsible for management and organisation, to ensure productivity and meaning. The

learning environment for this teaching culture is characterised by multiple tasks for the learner, organised according to learning subjects in accord with skills that must be acquired. These tasks necessitate memorisation of the material and practising the skills. Usually the tasks are closed, and allow very little adaptation of the task to pupils' fields of interest or academic level (Cooper et al., 1996).

From the learner's viewpoint this is expository reception learning. All the content is presented and provided for the learner in its final form and the learner only needs to absorb and assimilate the learning material often by memorisation. The learner can learn, understand and remember concepts and ideas without needing any previous experience of problem-solving and it is not essential for the learner to independently discover all the terms and principles in order to understand and use them in a reasonable manner (Ausubel, 1968).

Postareff et al. (2004) showed that it is only after a long process of pedagogic practice that teachers undergo change from a teacher-focused approach to a learner-focused approach Lindblom-Ylänne et al., (2006) indicate that these two perceptions of teaching, teacher-focused and learner-focused relate to way in which knowledge is transmitted noting that where the use of one perception increases the other decreases.

2.4.4 Online Pupil-Focused Teaching

Learner-focused teaching is based on the learner's active learning and active participation in the learning process (Cuban, 1984; 1990; Withall, 1985; Samuelowicz & Bain, 1992; Prosser et al., 1994; Trigwell & Prosser, 1996; Prosser & Trigwell, 1999; Vermunt & Verloop, 1999; Biggs, 1999; Samuelowicz & Bain, 2001; Kember & Kwan, 2002; Lindblom-Ylänne et al., 2006; Rennie, 2007; Delialioglu & Yildirim 2007).

Based on constructivist theories of learning, student-centred approaches to course design create an environment in which learners use critical analysis and

reflection to discover or work out for themselves an understanding of the subject or concept, often in conjunction with other learners. By combining a range of media and communication modes, the course no longer consists of one authorised version of knowledge conveyed by a lecture or a textbook. Web resources, interactions with other learners, the teacher's guidance, and experiences resulting from collaborative activities are all combined with the inputs of the course so that the students are given the responsibility to construct their own understanding of the topic (Meyers and Jones, 1993; Motschnig-Pitrik & Holzinger, 2002; Gudmundsson & Matthiasdottir 2004).

Relan and Gillani (1997) confirm this analysis of the impact of net-distributed education:

The predominant source of content shifts from the textbook and the teacher to a more varied source of information. Further, the nature of the content becomes dynamic, versus the static texts published on a certain date (p.44).

In distance-learning, 'the waiting time' needed for a response on the forum can be extended and this allows an opportunity for reflective and process learning, enabling writers to suggest their own ideas and approaches and to study those of their peers. Reflection is perceived as a mental dialogue in which individuals examine the information received from others or from other sources of knowledge as they relate to themselves. Many research findings support the encouragement of reflective processes during learning to allow learners to present arguments in an open and democratic fashion (Lapadat, 2002, Treacy et al., 2002).

The role of the teacher or tutor in on-line teaching is to generate an infrastructure for constructive interaction and to help students individually and collectively to negotiate their own meaning. The course designer, who may or may not be the teacher or tutor, needs to understand the strengths and weaknesses of available technologies and to know something about the

background of potential students, and about students' expectations (Lohnes and Kinzer, 2007).

Vovides et al. (2007) conclude that a course management system should inspire, motivate, and guide students to develop self-regulated cognitive skills for learning. This means that students are guided to play an active role in learning, become self-organised, and independent, and actively participate in the learning process to construct their knowledge. Supporting this conceptualisation, Cavin (2007) notes that student teachers who value student-centred teaching succeed in integrating data technology more smoothly in comparison to those who prefer teacher-centred teaching.

2.4.5 Teaching Presence

Teaching presence is an essential component in any on-line educational practice, in contrast to learning practice. Anderson et al. (2001) define teaching presence as:

The design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes (p.7).

In most educational settings, teaching presence is provided by one person, the teacher, who plans the educational experience, promoting the activities of learners in the group and providing direct instruction. In an on-line environment, and especially in computer mediated communications in higher education, a considerable part of this activity is performed by several people, including: the teaching designer, programme coordinator and the learners themselves. Thus Anderson et al (2001) prefer to call this component by the name 'teaching presence' and not 'teacher presence'. In the context of an on-line environment this variable relies on the presence of teaching expressed only in written language. Teaching presence begins before the course and is expressed through the instructor as a shaping force for teaching, planning and preparing the learning sequence. It continues during the course, while the instructor encourages discourse and provides direct teaching, as necessary. An

appropriate teaching presence engenders group learning. Garrison and Anderson (2004) emphasises that teachers should re-plan their approaches towards distance-teaching so that they exploit media abilities to a maximum. His view is that correct and intelligent use of media tools reinforces the teaching presence. Research studies (Anderson et al., 2001; Garrison and Anderson, 2004) indicate several components of teaching presence:

1. Design and organisation of teaching (planning and management). The design process for an on-line course needs much more time than for a traditional course. Planning enables thinking about processes, structure, assessment and reciprocal activity between the different elements. The teacher should be open (transparent) to the students during the planning processes. The teacher's actions in this area include construction of a learning programme and learning materials (including links to relevant sites), composing headers for the lectures, tasks for students, establishment of a timetable, instructions for effective and professional use of the computer-mediated media.
2. Promoting the discourse: this is important in order to maintain interest, motivation and involvement of the participants in the learning. In order to create a positive learning environment and so that the group of learners becomes a 'knowledge-creating community' (Scardemalia & Bereiter, 1994). The instructor should motivate social processes in the group and encourage them to learn. According to Piaget's viewpoint (1970), cognitive development requires the creation of cognitive conflict for the individual when other contrasting opinions are encountered. The solution of this conflict leads to higher levels of thinking and deduction. Thus the instructor's actions include: identification of areas of poor consensus/ lack of consensus, search for common understanding, encouragement, confirmation or reinforcement of the students' contributions, creation of a learning atmosphere, motivating participants to enter into discourse, encouraging discussion and also effective assessment of the process.

3. Direct Instruction: the instructor presents an intellectual and learning leadership and shares professional knowledge with others. The signs of this element are drawn from the Scaffolding Model of Vygotsky, in which the instructor or expert has a facilitating role, providing support for the novice's learning. In any case, the role of the instructor includes direct instruction based on the instructor's area of knowledge and pedagogic skills. Instruction includes the assimilation of remarks, referral to sources of knowledge and organisation of activities that enable the learners to create knowledge.

Jiang & Ting (2000) studied factors that influence the perception of students regarding learning in an on-line course. They found that three components of teaching presence influenced the pupils' achievements: the time devoted to interactions between the instructor and students, the establishment of clear expectations regarding the instructor-learner interaction and provision of well-timed supportive feedback.

In two additional studies, significant correlations were found between students' reports concerning a high level of teaching presence behaviours and a level of satisfaction regarding learning in on-line courses (Shea, Fredericksin, Pickett & Pelz, 2003; Shea, Pickett & Pelz, 2003).

A further study by Shea, Swan & Pickett (2005) examined students' perception of teaching presence in a course and their sense of belonging to the learner community. The study found that a framework including many components of teaching presence creates a learning environment in which a sense of belonging to the community also develops.

2.4.6 The Role of the Learning Forum Instructor

The personal characteristics of the forum instructor and the instructor's pedagogic colleagues significantly influence what goes on in the on-line forum (Inman, Kerwin and Mayes, 1999). The instructor should clarify the learning

goals of discussions and expectations for written products from the start specifying the levels of participation required and the criteria for assessment. The instructor should demonstrate an overt or covert presence in all discussions in order to prevent them becoming 'a noisy chorus' (Crosbie, 2005).

The instructor's ability and willingness to pay attention to forum participants' individual needs and respond immediately to their requests increases the extent of their motivation to participate and the extent of the learners' satisfaction from the learning experience (Brochet, 1989).

Heckman & Annabi (2005) suggest the design of a model for multiple-participant discourse between the instructor and learners. During the development of the on-line discussion, interest should be awakened in the quality of the joint or independent learning product, engendering exchange of substantive information between participants in the forum and also with participants outside the forum.

However, the lecturer in an on-line course should also initiate discussions in the course forum in order to create continuous dynamics for the discussions and interactions on the forum. It is however important to avoid an artificial forum discussion completely controlled by the course teacher (Mabrito, 2005).

In this manner, the instructor guides the discussion without any attempt to control it. The learners can participate in discussion more easily when they identify subjects that interest them. Chester & Gwynne (1998) suggest that the teacher should create designated spaces for a-synchronic communications for learners only. These are parallel channels for the project staffs or task groups in the on-line course, where these learners can split off from the main forum to a secondary forum of their own. In these closed cyberspaces they often conduct brain-storming and team work in small groups. The learners reap great benefits from the interaction with those participating in the project or task, without any anxiety regarding the reactions of the larger group. Full technical

support is provided for the distribution and collection of messages in a manner that enables division into separate subjects and dialogues (Lieblein, 2000).

According to Stodel et al. (2006) learners, who are appointed to the function of forum instructor, still need the supervisory instruction of the lecturer, who knows how to guide the character of the discussion. On the other hand, the tendency of the lecturer in an on-line course to invest much in contents and enrichment, but with a passive appearance in the forum instruction, is seen as an obstacle by learners who prefer more active on-line guidance and fewer contents.

It should be noted that learners' participation in the on-line forum is not uniform. Mason (1994) and Taylor (2002) indicate three types of learner participation in on-line discussions:

1. Workers, proactive participation group. Workers participate actively in the discussions and visit the class site regularly.
2. Lurkers, peripheral participation group, participating occasionally, but mostly in a 'read-only' mode.
3. Shirkers, parsimonious participation group. Shirkers perform the minimum required participation with fewer postings and visits to the class site.

Learners' participation in the multi-directional interaction is as an equal among equals in the forum in which questions are asked and answers provided both by the instructor and by peers. This is a basis for meaningful learning (Vrasidas, 2000). This interaction provides a sense of cooperation between colleagues and an equal status for all. In addition learners initiate the introduction of learnt knowledge and examine it by providing answers to questions asked by their colleagues, creating a status of 'expert' for themselves, that constitutes an important element in constructivist learning (Resnick, 1987; Bendar, Cunningham, Duffy & Perry, 1992; Bendar et al., 1992).

The forum also serves as a virtual platform for the presentation of tasks. The teacher's role is to correctly structure the tasks. The teacher's tasks can improve the level of discussion (Mason, 1998), while the learners creation of authentic tasks enhances the discussion (Wickstrom, 2003).

The public nature of the discussions, also enriches the learner who chooses to be a 'silent learner' even if the learner is not active and does not contribute opinions and understandings to the discussion, the very fact that learners' are exposed to the discussions enriches their world and helps to structure their knowledge. Additionally, learners who have difficulty with oral communication in class are helped to cooperate with other learners by the forum, so that those who participate tacitly in the classroom may become dominant in the forum (Mason, 1998). Mabrito (2005) notes that learners feel more comfortable to manage their interaction with the lecturer on a forum course than in a synchronic channel. However, Hara, Bonk & Angeli (2000) found that most learners limit their participation to what is demanded for the course.

A study published by Lord & Lomicka (2008) indicates that student-teachers see the on-line forum as a means to update information and transmit messages and less as a means for interaction and cooperation. Thus computerised forums do not create any meaningful cooperative interaction between student-teachers. In contrast chat channels and face-to-face channels in a course contribute far more to inter-learner interaction and the sense of community in a course.

Yule & Glasser (1992) point to a number of roles involved in leading a discussion:

1. Assisting communication – helping to distribute ideas and understanding them.
2. Stimulating – encouraging learners to deepen their attitudes. Surfacing any resistance will perhaps engender new opportunities for discussion.

3. Mediating – encouraging the distribution of ideas and the consolidation of the discussion, while leading it towards the most productive areas. The emphasis here is on the general form of the discussion.
4. Supervising – the teacher supervises the general authenticity and continuity and logic of the discourse while paying special attention to defective logic. Supervision focuses on assessing what is said, and also deals with consideration of the participants' attention and listening – whether they focus on the discussed concepts.
5. Supporting – the teacher provides encouragement and support to others. The participants encourage each other, affirming their contributions and allowing others to make their own comments.
6. Scaffolding – the teacher helps in the construction of developed ideas or by structuring the form of the argument or through provision of clues to encourage learners to expand what they have said.

Paulsen (1995) suggested a list of roles that an educational computer conference facilitator could fulfil and organised them according to areas of responsibility. He determined the level of importance of each role in the area as presented in the following table:

Table 5: Roles for the On-line Teacher

Role	Organisational function	Social function	Intellectual function
goal setter	High		
discriminator			High
host	High		
pace setter	High		
explainer			
entertainer			
lecturer		Low	High
tutor	High		High
facilitator	High	High	High
mediator	High		High
mentor	Low		
assistant			
provocateur			high
observer	Low	low	low
participant	Low		

Source: Paulsen, M.F. (1995)

In contrast, Berge & Collins (1995) related to the roles of the forum instructor on the net from the instructor's viewpoint and defined four areas of consideration: organisational, cognitive, social and technical.

2.4.7 Assessment

Assessment is an inseparable part of the educational process so that there is a direct connection between teaching and examination of the results of the learning (Birenbaum, 1997; Wiggins & McTighe, 1998; Assessment Reform Group, 1999; Carr & Harris, 2001; Dochy, 2001).

The learner independently uses constructivist construction to structure the studied knowledge and reflects on the learning process (Berk, 1994; Bruner, 1996; Manus, 1996; Wood, 1998; Baxter-Magolda, 2000; King, 2000). Assessment is intended to improve the product and requires more mental investment and change in learning and memory (Campbell, 1988). Assessment is conducted according to criteria which set the standard that indicates success in achieving the goal. Rolheister, Bower & Stevahn (2000) distinguish two types of assessment: formative and summative; while Scriven (1967) and Khan (2004) distinguish between mid-process and post-process assessment.

Higher education assessment is a process which attempts to discover whether students succeeded in doing what the teacher/lecturer wanted them to do (Jordan, 1989). Arter (1995) claims that knowing the criteria for assessment in advance equips the learner with concepts that enable self-reflection, critical thinking, responsibility for learning and skills for processing information, whose acquisition is not automatic. This knowledge helps to develop a vocabulary for thinking and improvement of performance. Sweet & Zimmermann (1992) who relate to 'performance assessment', claim that it is important for the learner to know the criteria ahead of time, since the very fact of this knowledge influences and directs performance.

Shulman (2007) emphasises that assessment in higher education cannot rely on narrow assessment tools but must be founded on several narratives that supplement the assessment. The assessment of students in colleges and universities should not just serve external assessment systems, in addition lecturers should conduct continuous internal assessment regarding the achievement of the goals they wanted to achieve. No less important, the

assessment method should be completely transparent for students in order to empower their progress. Formative assessment should be combined with research and development of new computer technologies, so that the experiences of colleges and universities using innovative assessment methods are important, in order to learn lessons from them, informing lecturers' own attempts to improve the assessment. True assessment in the universities should reflect in-depth relations between all types of learning narratives in order to reflect the students' type of thinking.

The basic assumption is that the practice of this new teaching necessitates a parallel change in methods of assessment. On-line teaching creates opportunities with different meaning and demands in comparison to traditional teaching. Technology enables efficient personal follow-up. It also enables formative assessment in real-time and correction of the teaching in accordance with this. Technology broadens the area of measurement and makes it richer, facilitating the teacher's assessment of the learning and enabling the teacher to conduct more systematic supervision (Thron, 2001; Lynch, 2002; Killion, 2002).

According to Corneaux (2005) every computer-mediated assessment method has its own guiding principles and theory. The integration of technology can support constructivist pedagogy, *inter alia*, by broadening the range of learning achievements and enriching the regular assessment methods for the class (Fouts, 2000; Quellmalz & Haertel, 2000).

Recently a consensus has formed concerning the important potential of technology in the application of contemporary concepts of formative assessment (McLoughlin & Reid, 2002). Using computer-mediated technology it is possible to develop a variety of interactive items that enable assessment of the learner's knowledge and high-order thinking skills. The character of products constructed by the learner can be varied and it is possible to track the learner's thinking processes (April & Stephen, 2002). Assessment in an on-line environment can represent phenomena and systems that are too large or too small, too dynamic and complex or too risky to integrate them within a paper

and pencil test and to enable recording of problem-solving processes by the learner (Quellmalz & Haertel, 2000).

Computer-mediated assessment systems enable teachers to develop examinations by themselves according to their teaching goals by using existing items reservoirs, catalogued according to different characteristics. Another important use of Internet-based systems relates to reportage of assessment data and allows teachers to receive an analysis of the learner's marks close to the end of the examination in different segments according to request (Wang et al., 2004). These reports, accessible to teachers without any effort on their part, enable them to adapt the following stages of teaching. On-line systems of assessment tools can therefore serve as diagnostic tools that reinforce the teacher's assessment ability and also significantly help to improve learning processes and the learners' achievements (He & Tymms, 2005).

Computer technology enables teachers to respond to differences between the learners. Personal assessment tasks can be adapted to the learner's individual needs and pace. A learner can receive support or clues (for example using a dictionary, interactive maps, additional explanation) accommodations for special needs, such as: enlargement of fonts, reading aloud of texts or feedback (immediate or delayed) concerning performances. Also in such an environment the learner can be more involved in the learning and assessment processes. It is therefore possible to enable the learners to become the 'leaders' in the exams and to adapt exams to their needs with regard to level of difficulty, rate at which the questions are received, the desired language and the desired representation (Alderson, 2006).

Hazari (2004) distinguishes two types of assessment of the students' achievements in a holistic and analytical forum:

1. Holistic assessment performed by collecting all the student's messages/ and assigning a general grade,
2. Analytical assessment performed by assigning points for each message and calculating the total.

Elliot (2008) drew a distinction between Assessment 1.0 based on class-based formal and controlled assessment, and Assessment 2.0 which is authentic, flexible and natural to the learner's environment and the authentic teleprocessed products of the learner today. Elliot (2008) believes that Assessment 2.0 will eventually be influenced by teleprocessing processes known today on the Internet as Web 2. Today, computerised assessment has taken on the characteristics of traditional assessment and from a perceptual viewpoint it belongs in practice to the generation of Assessment 1.0. It is formal, lacks flexibility, is detached from the learners' experiences and alienated from the learning methods and skills that they employ today in the Internet era. Assessment 2.0 will enable the learner to express knowledge, creativity and skills in a more authentic manner. It will enable the teacher to challenge the learner to understand investigative tasks and will be based more on challenging problem-based learning, case studies, peer assessment and a more varied choice of subjects for research, data-collection and data-processing. Roth, Ivanchenko & Record (2008) added an additional point, the need for teacher-training to assess the learner's responses within a computerised system on the basis of a student response model. In conclusion, Mateo & Sangrà (2008) claims that a new paradigm is needed to assess planning and activity in computerised learning; this perception is reflected in pedagogic thinking that believes that the development of on-line learning necessitates another paradigm for learning assessment. Further details concerning Learning Styles and the Characteristics of the Adult Learner can be found in Appendix IVA.

To summarise: teacher-educators teaching distance-teaching need to act in new and other areas. Nevertheless these areas rely on extant theories such as constructivism, teacher-focused teaching, and learner-focused teaching. The teacher presence is provided to a different extent and in a different strength. The teacher-educator has a new role as leader of the forum, in which he/she can adopt different models of guidance and activity and in addition assessment

takes on a new and different appearance. All these options must be employed to provide responses to the different learning styles of the learners.

2.5 Channels of Interaction

2.5.1 Learner-interface Interaction

Hillman, Willis and Gunawardena (1994) defined learner-interface relations as an interaction that is performed between the learner and technology that serves as a sort of mediator in the educational process of distance-teaching. There are several aspects to the interaction with the interface: easy and convenient access for the user to all the elements that construct the site, comfortable access to learning resources, varied communications, use of varied tools and cognitive, emotional and technical support. All these elements significantly influence the quality and amount of interactions between peers, students, the teacher and contents and the students' satisfaction regarding the course (Thompson & McGrath, 1999; Sagee, Katz, Yablom & Sagee, 2001; 2002; Sagee, 2002; Swan, 2004).

However, technological and organisational problems may mean that learning in a computer-mediated environment arouses frustration and confusion (Mendels, 1999). Limitations in the accessibility of the computer and Internet and technological defects constitute two of the most serious obstacles for an on-line course (Buss, 2001). It is therefore very important to have a single platform for learning (Killion, 2002). More details regarding the HighLearn platform can be found in Appendix IIB.

A study conducted by Pan (2005) showed that a discussion using this software created a sense of effective learning for learners. The software allowed an efficient interaction with the instructor and between the learners, provided information, clarifications and immediate feedback and thus encouraged their learning.

In a study by Pan & Sullivan (2005) learners indicated that synchronic communication was important for them during the course especially when a team project was involved. From interviews with the learners it was found that the audio communications based on Skype (for details see Appendix IE) were from their viewpoint the most effective because they were more focused and more aware of the research subjects discussed during the interaction. The subjects the learners discussed were better formed and became clearer as a result of Skype conversations. They indicated that use of Skype software improved the quality of the dialogue between learner teams and the instructor.

Jonassen et al. (1998) argued that technology should serve as a tool for the construction of knowledge among learners and not for transmission of knowledge. Meaning that technology should be used together with changes in teaching methods and not serve as an aide to the teacher to adhere to old teaching methods. Observation of the education field shows that there are still teachers and lecturers who do not teach with the assistance of advanced technology or use them restrictedly. One of the reasons for this is the lack of willingness to change teaching habits and to assimilate new teaching tools (Hannafin & Savenye, 1993; Hativa & Lesgold, 1996; Barak, 2006). However, intelligent use of software and Internet systems may help to create constructive learning environments that encourage meaningful learning and the learners' assimilation of knowledge (Barak & Rafaeli, 2004; Dori & Belcher, 2005). Nevertheless, however wonderful it may seem, not everything that is possible from a technological viewpoint should automatically become desirable for teaching (Sarason, 1984).

In addition, Gomez et al. (2008) noted that it is important to recognise that certain technological tools are appropriate for each discipline, and each discipline uses the tools in a different way.

2.5.2 Instructor-Learner-Content Interaction

Learner-content interaction is the heart of the constructivist learning process that takes place when a learner copes with contents. This interactive process involves the construction of new bodies of knowledge based on past experience, on reprocessing the learnt content and on the construction of new concepts, which are internalised (Vygotsky, 1978; Moore, 1989; Vrasidas, 2000). However, during virtual teaching the learners conduct interactions with learning contents while the amount of information and material grows and it becomes difficult to continue to interact with all these materials (Wagner, 1994; Lewis, 1999).

Thus on-line courses need to be based on simple navigating methods that are understood by the users (Wilson and Ryder, 1988; Rheingold, 1993; Anderson and Garrison, 1998; Goldstein, 2001; Djoudi & Harous, 2001). Knowledge flows from every location to every location and it is accessible to all at any place and time (Kiesker, 1997). Thus what can be provided to the learners are data, the learners can use their own abilities or the help of an instructor to turn these data into knowledge (Brooks & Brooks, 1993).

The conclusion drawn from this is that the teacher needs to design the learning environment to enable this ability to be cultivated. Applying the data in data-in-the-making, problem-solving and invention of alternatives is what turns the data into knowledge. However there are also obviously many advantages since distance-learning facilitates an encounter with learners from all over the world, such as those in courses and seminars thus providing many possibilities for 'just-in-time' learning (Killion, 2002). The computer-mediated environment enables each learner to learn according to their own field of interest, even if there are only a small number of learners who are interested in studying the particular subject (Dede, 1990).

Margalit (2004) explains the use of a simple technology 'headers discourse' intended to make more intelligent use of the medium of forums and electronic post and to realise the additional learning/ teaching potential that they embody.

Technology uses the formats of forums and electronic post as they are by creating an explicit 'headers discourse' that is clear, visible, continuous, effective, short, intelligent and economical, indicating something about the substance of the discourse even before opening the messages. Participants in a discussion agree to maintain the following rules for correspondence: those who write messages on a forum or e-mail include the key word of the discussion in the header indicating the subject of the discussion, followed by a colon and then the key sentence of the message – a sentence that represents the concept expressed in the message in the best possible way. This method makes it easy for the discussion participants to swiftly skim the substance of the discussion and of the message or mail that is relevant for them. The participants' ability to use headers improves and they derive knowledge from them through the autonomous creation of and reading of headers.

In comparison to traditional learning in the classroom, teleprocessed learning has a character of more self-direction, where reinforcement is provided not by teachers, but rather from the contents. Thus the contents in an on-line course should be partially interactive to encourage the learner's motivation. The planning of contents should therefore respond to the different learning styles of the learners (Moore & Kearsley, 1996; Anderson & Garrison, 1998; Mabrito, 2005). In order to ensure that their courses arouse and promote effective interaction, the course instructors need to ensure that the organisation of the contents is easy for surfing and orientation (LaMonica, 2001). Mabrito (2005) suggests planning the learning space in a course in a functional manner that is clear to students from the first glance. Students need to see all the areas and categories of contents in the course to facilitate identification and surfing.

According to the *Usability Principles* suggested by Nielsen (2000) for good websites, students should be able to reach each page of contents in the site with three clicks of the mouse. Another consideration in the planning of interaction with learning materials is connected with the format of the sources of knowledge. Most lecturers base their work on written textual materials, but some students are not cognitively disposed to the textual sources of knowledge

and they prefer to see the contents in the form of rich graphical presentations or video clips, some others prefer oral or video files as samples alongside text. It is therefore recommended that different types of data sources should be integrated within the course site, and not to suffice with a few textual materials (Marbito). A difficult problem that remains is that students do not always read the texts (Rossman, 1995; Carr-Chellman & Duchastel, 2000; Mills, 2000) so that Stodel et al. (2006) noted that it is often necessary in on-line courses to create interest and enthusiasm by focusing on several in-depth subjects instead of a rapid transition between contents and subjects.

Informal writing on the forum helps the learners to perform meaningful interaction with the contents that differs in substance from the interaction that takes place during formal writing in a traditional class (Funaro & Montell, 1999). Intensified involvement of learners in a forum contributes to the level of discussion. LaGrandeur (1996) added that electronic discussions help learners to become more aware of the literacy process – to recognise the value of writing rough drafts, revising the drafting of their arguments, and presenting references for their ideas on their way to composing a complete article. In addition, the quality of the writing on a forum is higher because the writers have time and opportunities to edit their work (Anderson, 1996). However, a study by Salant (2004) found that pupils with low linguistic skills were liable to have inferior status in a forum because this tool only enabled the entering of textual data.

Who possesses the knowledge at the initial stages of on-line teaching and at later stages? Exposure of knowledge removes the knowledge from the teacher's possession (Baraniuk, 2008) creating a 'frightening' situation, no less, in which the students, may use it as if it were theirs, for example they can read it in their own order, performing actions from the end to the beginning etc. Even if it is a book or video-film that is possessed, the student can choose how to use the provided information. In the on-line environment in which the information is displayed in many different structures, 'the intolerable ease' of

turning pages, searching, cutting, copying and pasting turn the freedom of choice into a definitely larger management of knowledge.

2.5.3 Learner-Instructor Interaction

Learner-instructor interaction takes place between the learner and an expert who transmits contents or prepares and arranges them. This interaction aims to improve the learner's motivation to learn, to assist learning and to modify the teaching methods to the learner's needs (Wilson & Ryder, 1988; Moore, 1989). In learner-instructor face-to-face relations the interaction is synchronic and usually occurs in real-time in a classroom. In learning through the Internet, interaction occurs outside the classroom and can be in real-time or time delayed thus enabling participants to think and deliberate before responding. Interaction of this kind spreads out over a large range of possibilities from the receipt of contents written by the instructor on the site, to a dialogue in which the learner asks questions and receives answers concerning the content and processes that are happening on the site. The teacher listens to questions, answers, providing feedback and encourages the learner (Moore, 1989; Moore and Kearsley, 1996; Vrasidas, 2000; Mayes, 2001; LaMonica, 2001; Lynch, 2002; Anderson, 2003; Mabrito, 2005).

According to Garrison & Anderson (2004) the success of distance-learning depends on the ability of the instructor to create a learning environment that engenders the learners' motivation for a significant advance in meaningful learning and creation of products.

The learner's interaction with the teacher is characterised by different features (Moore & Kearsley, 1996; LaMonica, 2001; Lynch, 2002; Mabrito, 2005): The lone distance-learners should receive the sense that there is value in their investment and that someone waits for and reacts in a constructive manner to each of their learning steps (Tagg & Dickeson, 1995). Gelbart (2000) notes the importance of providing a prompt reaction to learner requests in a distance-teaching course, more than would be given in a face-to-face lesson, as a factor that increases the learners' confidence and motivation for the course, since

distance-learners need far more encouragement and support (Anderson & Garrison, 1998; Goldstein, 2001; Galland, 2002). It is therefore important that the time-span of the teacher's reply should not take longer than 24 hours (Kubala, 2000). Learners participating in virtual courses may feel isolated in a virtual space. One way to overcome such difficulties is to maintain virtual reception hours, in which questions can be asked and an immediate reply received, providing swift feedback (within a few days) for tasks presented for inspection, and conducting regular weekly communication with the learners, including richly written messages, in which the teachers can encourage learners to turn to them with any question. In this way, a sense of friendship and community among colleagues and between the teacher and each learner is created (Serwatka, 2002). Romeo (2001) found that adult students took an on-line course because they believed that they would have more contact with the teacher and would receive more feedback for their work in comparison to a face-to-face course. Mullen & Tallent-Runnels (2005) found that students felt that the teacher's attentiveness in the on-line environment was different from that in a traditional classroom, since the teacher encouraged each student to participate and offer opinions, to present personal examples and provide material.

2.5.4 Learner-Learner Interaction

Learner-learner interaction includes any sort of communication between learner-participants in the course, from social communication, continuing through technical communication and ending with cognitive communication that relates to the course contents. In this interaction the learners exchange ideas and opinions, assess and assist each other (Moore, 1989). Team work skills are considered to be life-long skills, for all disciplines that can be learnt and transmitted (Overtomm, 2000; McLoughlin, 2001). The educational approach that encourages collaborative learning is founded on the use of social situations for learning. According to this method, cooperation is formed between learners at the level of learning planning, discussions, collection of materials etc. The dialogue between learners is a cornerstone for OR collaborative learning

(Kagan, 1992). Slavin (1990) and Johnson & Johnson (1996) described collaborative learning as the use of small groups in an instructed environment where the learners learn together in order to improve their own and their peers' achievements as far as possible. Collaborative learning is very different from traditional class lessons both from a theoretical and a practical viewpoint (Sharan & Sharan, 1987). According to Johnson & Johnson (1996) collaborative group work necessitates reciprocal interdependence, personal trust and control both in the interpersonal interaction and in the construction of the group process. There is much evidence that learners who work cooperatively can absorb knowledge from teachers better than college learners who work alone (Franklin, Griffin & Perry, 1994). In addition to improving their learning, it has been demonstrated that collaborative learning also improves learners' social skills (Stevens & Slavin, 1995) and their confidence in their ability to judge contents (Nichols & Miller, 1994) and decreases their anxieties (Keeler & Anson, 1995). Slavin (1996) indicates that systematically, and irrespective of differences in age, subject of study and the objects of assessment, collaborative learning is more effective than individual learning, even for weak learners, learners from poor neighbourhoods and learners from different cultural backgrounds. Many researchers (Conklin, 1987; Landow, 1992; Driscoll, 1994; Jacobson, Maouri, Mishra & Kolar, 1996; Salomon, 1998) claim that meaningful learning only occurs within interactive, cooperative processes with peers, teachers, instructors and others, that represent a variety of viewpoints and a range of alternative for authentic problem-solving. Technology has the potential to serve as a calculated means for the creation of communities even if the participants are distanced one from the other geographically, in age or in opinions (Gomez et al., 2008).

The presence of learners in a virtual class is different than in a traditional classroom, and for this reason many researchers have indicated that the interaction between learners is very important (Wilson and Ryder, 1988; Anderson & Garrison, 1998; Goldstein, 2001; Picciano, 2002; Hughes et al., 2002).

Learner-learner interaction is especially important in cooperative task work, and means that the learner is less dependent on the teacher (Anderson & Garrison, 1998). It is very important that the teacher should employ pedagogic strategies in order to prevent students' isolation and possible disorientation (Mcox & McDowell, 2008).

The learners' perception of the interaction in a computer-mediated course has a strong impact on their assessment of the course's quality (Zirkin & Sumler, 1995; Klesius, Hosman & Thompson, 1997). Studies relating to on-line learning found that learners who succeeded in an on-line course thought that the main factor for their success was the cooperation within the course that enabled them to be active participants (Fulford and Zhang, 1993; Verneil & Berge, 2000). Interaction between the learners compensates for the lack of face-to-face meetings during on-line courses, and creates a sense of belonging to a community. Interaction facilitates mutual assistance between learners and encourages collaborative learning (Coghlan & Stevens, 2000).

In order to define a group of learners as a learner community, the learners must demonstrate reciprocal involvement in the learning, willingness to see learning tasks as a joint experience and ability to share knowledge that they have. A learner community has two important goals: the first is aimed at negotiating knowledge in order to create new knowledge and meaningful understandings. Here, work is distributed between peers, with relatively equal status, but with different viewpoints and various areas of expertise (Wenger, 1998). The second type is aimed at appropriating knowledge. Here the learner who knows less acquires knowledge from a learner who knows more, and the goal is to share knowledge with other members who are already in the community. A community of learners succeeds in achieving its goals through an interactive process where the learners' involvement and cooperation provides motivation to learn (Hung & Chen, 2006).

A virtual community of learners is a group of people with a common subject or area of interest, that deals with the exchange of knowledge, exchange of opinions, cooperative learning and data-processing while exploiting the advantages of technology to create the connection between participants

beyond limitations of time and place (Comstock & Fox, 1995; Oren et al., 2000). Research (Scardamalia & Bereiter, 1987; Wegerif, 1998; Shea et al., 2001; Rovai, 2002; Weaver & Albion, 2005) affirms that the success of the on-line course depends on the learners' perceptions regarding their part in the community, and that reciprocal relations between them enable exposure of different viewpoints so that they experience deeper learning than would occur if they studied alone. The learner's sense of belonging to the community also reduces percentages of dropout from the course and reinforces the learners' sense of satisfaction regarding the course.

It should be noted that the interactive skills of computer technology are a key-feature that enables feedback to be received regarding the learner's performances, examination of ideas and reinforcement of their understanding. A computer-mediated network may be constructed and this will reinforce the community of learners both locally and globally and expand the circle of learners (Kozma, 2003). Studies have shown that correct use of technology is very valuable for support of active and cooperative learning (Linn, Davis & Bell, 2004; Salomon & Ben-Zvi, 2006; Stahl, 2006). Nevertheless, in higher education, technology-supported courses continues to use traditional pedagogy of 'transmission of knowledge' in which the teacher concentrates particularly on contents and less on learning processes (Herrington et al., 2005).

The perception of the class as a 'community of learners' (Brown, 1994; Brown et al.1995) stems from a basic assumption that the framework of any learning group is a reservoir of knowledge, skills, insights and expertise. Correct and wise organisation of any class can lead community participants to share their resources, enriching one another, and even distributing tasks and responsibilities for performance among small groups of learners. This assumption led to the development of the *Community of Inquiry* model (Garrison, Anderson & Archer, 2000; Garrison & Anderson, 2004) that positions the relations created through technology between learners and between the learners and the teacher at the centre of the learning events. This computer-mediated model determines that the on-line learning environment is founded on three layers: the cognitive layer, the social layer and the teaching layer.

Meaningful learning exists when there is an interaction between the participants in the learning process on these three layers. The teaching presence of the teacher constitutes an important link in the operation of an on-line community of inquiry. The role of the on-line teacher becomes even more important than that of a frontal-method teacher since the on-line teacher has additional functions: to design and plan the computer-mediated activities, to manage the on-line activities as they occur both organisationally and socially and to act as an expert for contents, responsible for direct instruction. Thus the construction of an on-line community is considered as having the utmost importance for successful distance-learning.

Mcox & McDowell, (2008) suggested several detailed and practical pedagogic strategies that could be implemented with the goal of creating a community of learners within the framework of on-line courses for distance-learning. He relies on many years of experience in distance-teaching and also on the 'Three-Stage Theory' of Brown (2001) that includes: 'making friends,' 'community conferment' and the development of 'camaraderie'. Filling these functions means that the on-line teacher (e-moderator) needs to develop new teaching skills that were not required in face-to-face teaching (Salmon, 2004) and also engenders the development of a new type of activities (e-tivities) appropriate for the on-line environment (Salmon, 2002). The community of learners is therefore very dependent on its instructor (Pedulko & France, 2003; Vesely et al., 2007; Eileen & McDowel, 2008).

To summarise: different manners of interaction, and the frequency and manners of use create different modes of interaction for the teacher and the learner/learners. The use of different options and technological tools opens new horizons for teachers and the question that emerges from this is: how do teachers exploit this potential?

2.5.5 Social Presence

Piaget (1967) who indicated the importance of social interaction as a condition for cognitive development and later Vygotsky (1978) whose social-historical approach emphasised the social dimension in cognitive development both contributed to the formation of teaching approaches that encourage cooperative learning, work in groups and exposure to different social contexts during the teaching/learning process.

Resnick & Rusk (1996) noted the growing recognition that thinking occurs through interaction with others, often through communications media and technology. Hillman (1999) sees the interaction patterns in on-line courses as resembling discussion while the interaction patterns in a face-to-face course resemble recitation.

The social dimension in a-synchronic learning on the net constitutes a significant component that influences the learner's sense of being an 'insider' or sense of lack of belonging: being an 'outsider' and the learner's sense of success or failure in the course (Wegerif, 1998). Social activity between learners is an essential condition for a course's success (Na Ubon, 2005; Schrader, 2008). Thus the lecturer must foster and develop a community and encourage learners to regularly correspond with one another (Burge, 1994). Insung (2002) pointed to two different types of social interaction that take place between learners: collaborative interactions between learners concerning learning tasks and interpersonal interaction that includes personal relations between the learners and instructors or between the learners.

Garrison et al. (2000) defined a social presence as:

The ability of participants in a community of inquiry to project themselves socially and emotionally, as 'real people', through the medium of communication being used (p. 94).

Rourke, Anderson, Garrison & Archer (1999) who studied the existence of social presence in written texts in learning forums, related to three categories of social presence in the content of an on-line discussion, that each have a different influence on the perception of social presence in a given learners' group:

1. Emotional reactions, including the use of 'emoticons', humour and self-exposure.
2. Interactive reactions, including reactions to messages of others, direct quotations and referral to content of messages from others.
3. Reactions that make the group more cohesive, including sharing feelings instead of transmitting knowledge.

According to Wegerif (1998) the human mediator has an important function in creating social learning and encouraging reciprocal actions in a virtual course. The teacher's commitment and encouragement and provision of incentives for learners, together with the provision of the possibility for learners to exchange not only information but also social messages between them, constitutes an essential layer in the effectiveness of the computer assisted course (Buss, 2001).

Garrison and Anderson (2004) explained the teacher's role in establishing social presence:

1. Acknowledge and welcome participants as they enter a discussion,
2. Be encouraging ,gentle and supportive while directing discussion,
3. Project your personality as a teacher and allow students to get to know you as a person to the appropriate degree,
4. Suggest that students log-on at least three times per week,
5. Encourage students to acknowledge individuals when responding.
6. Laud contributions when appropriate,
7. Be conversational and not too formal in communications,
8. Encourage "lurkers" to participate,
9. Express feelings but avoid flaming,
10. Be cautious using humour, at least until familiarity is achieved,

11. Encourage students to inform the teacher by e-mail of tensions or anxiety,
12. Shape discussion but don't dominate,
13. Provide feedback with respect,
14. Be constructive with corrective criticism,
15. Provide comments,
16. Be open to negotiation and providing reasons,
17. Deal with conflict quickly and privately.

In a dialogue between teacher-educators and their colleagues Wood (2007) asserts it is insufficient to use the routine model in which teachers, who are members of the learners' community, in most cases simply absorb knowledge, but rather the activity of the community on the creation of knowledge, disseminating and maintaining it with different tools.

To summarise: the methods of interaction in the Teacher-Student (s)-Students relationship and the content and perception of importance of a social presence can lead to the creation of new teaching modes for the teachers.

2.6 Disciplinary Fields of Knowledge

Disciplines play an important role in higher education (Ylijoki, 2000). Schwab (1964a) emphasised the importance of teaching the discipline's knowledge structure as a precondition for understanding the nature of a discipline. A discipline's knowledge structure is linked with the methodology used by those who research the area. Thus in the opinion of Schwab (1964b) it is impossible to gain an in-depth understanding of a research or of the rules of a particular discipline without learning the knowledge structure of that discipline.

The knowledge structure describes the forms and ways in which a particular body of knowledge is organised, its system of assumptions, determinations or symbols which can be used to generalise everything else that can be found in this field in the best possible way (Bruner, 1960). The structure is founded on

phenomena or data that can be organised within a conceptual system, this conceptual system is organised within a system of principles and they create the uniqueness of the particular structure. Each knowledge structure therefore has attributes that characterise it and distinguish it from other structures. These characterising attributes of a knowledge structure are expressed, *inter alia*, in unique questions that the structure's contents are intended to answer and in the research tools used for those contents (Stark & Latucca, 1994; Lukinsky, 1970).

Teachers develop educational approaches towards knowledge and teaching (Barnes, 1976), while their teaching experience contributes significantly to the richness and internal connections between the different areas of the teacher's knowledge (Munby, Russel & Martin, 2001). Thus, teaching needs to focus on the knowledge structure of their fields of knowledge and not only on the contents included in them (Olson, 2007).

The relationship between epistemological beliefs and the knowledge structure of different disciplines have been analysed in many studies (Lindblom-Ylänne et al., 2006). Even though we know little about the relations between disciplines and approaches to teaching, there are some studies which have focused on differences in academic culture between different disciplines (Biglan, 1973; Kolb, 1981; Becher, 1987, 1994; Neumann et al., 2002). Research has also been conducted on disciplinary ways of thinking and the effect of a particular discipline on teaching, learning and research (Smeby, 1996; Neumann, 2001).

Becher (1989) following Biglan (1973) and Kolb (1981) described four categories of disciplines distinguished by their cultural and epistemological differences and Neumann et al. (2002) defined these categories as follows:

1. 'Pure hard' knowledge can be described as cumulative in nature. Teaching content is linear, straightforward and not contentious. Instructional methods are mainly mass lectures and problem-based seminars. Student learning focuses on fact retention and on the ability to solve logically structured problems.

2. 'Pure soft' knowledge is holistic and qualitative in nature. Teaching methods include more face-to-face class meetings and tutorial teaching including discussions and debates. Creativity in thinking and fluency of expression are emphasised in student learning.
3. 'Applied hard' knowledge is linear in sequence and based on factual understanding. These sciences relate to mastery of the physical environment. Teaching methods concentrate on simulations and case studies in relation to professional settings. As in 'pure hard' sciences, students are expected to learn facts, but in 'applied hard' sciences there is more emphasis on practical competencies and on the ability to apply theoretical ideas to professional contexts.
4. 'Applied soft' disciplines knowledge is accumulated in a re-iterative process. Teaching methods are close to those of the 'pure soft' disciplines. The emphasis is on personal growth and intellectual breadth.

The research literature indicates a correlation between discipline and focus of teaching. Teachers of 'hard disciplines' reported more use of a teacher-focused approach while those who taught 'soft disciplines' were more learner-focused (Trigwell, 2002; Lueddeke, 2003; Lindblom-Ylänne et al., 2006). However, a closer look, using the hard–soft, pure–applied categories of Biglan (1973) and Becher (1989), did not reveal significant differences in the teaching approaches between the 'pure' and 'applied' groups of either 'hard' disciplines or 'soft' disciplines. This indicates that there were more differences between approaches to teaching of teachers from 'soft' and 'hard' disciplines within these two groups when divided into 'pure' and 'applied' subgroups.

This quantitatively derived result contrasts with the conclusions of qualitative studies of Neumann et al. (2002), who described teaching in 'hard' disciplines as involving mainly mass lectures and problem-based seminars, or as focused on simulations and case studies in relation to professional settings, while in the 'soft' disciplines there are more face-to-face class meetings and tutorial teaching including discussions and debates.

2.6.1 Sciences

Schwab (1962) defined sciences teaching as a 'process of enquiry'. Scientific laboratory activity requires team work and cooperation. The less formal atmosphere (in comparison to a classroom) means that the opportunities for pupil-teacher interaction and interaction between the pupils are greater. These opportunities can potentially foster positive social interactions, which help to create a positive and constructive learning environment (Lazarowitz, Baird, Hertz-Lazarowitz & Jeninks, 1985; Tobin, 1990; Lazarowitz, 1991). In order to teach science through investigation the teachers must undergo an intensive comprehensive process of professional development, to equip them with the necessary knowledge and skills. In order to guide the pupils in the performance of research experimentation, the teachers need experience in research similar to that which they desire from their pupils (Kennedy, 1998; Krajcik, Mamlok & Hug, 2001).

The constructivist approach to science education recommends that pupils should construct their knowledge by gradual progress helped by a peer or adult (Piaget, 1926; Vygotsky, 1978). The function of knowledge construction in science education was explained and developed by Driver & Bell (1986) and Driver & Oldham (1986). They explain that learners construct knowledge through reciprocal relations which take place in the classroom learning process.

They identified six characteristics of the application of the constructivist approach in science education:

1. Learning achievements depend upon the knowledge, goals and the motivation that pupils bring with them to the class.
2. Construction of personal and significant knowledge is combined with learning of subject-matter.
3. Learners acquire meaningful construction of knowledge in an active and continuous process.
4. Learners assess meaningful construction through processes of rejection and acceptance.
5. The final responsibility for learning depends on the learner.

6. Pupils construct meaningful styles by experiencing authentic objects and through their natural language.

An additional means for teaching sciences is through analogies. Analogy enables the illustration of an abstract concept. The basis for analogy is usually from the pupils' world and it can constitute a preliminary organiser and connection between pupils' prior knowledge and their new knowledge. There are several stages in the use of analogy (Harrison & Treagust, 1994).

1. Definition of the biological concept.
2. Presentation of the analogy and consequent questioning thought.
3. Discussion of the relevant characteristics of the analogy and their analysis.
4. Discussion of what is similar between the analogy and the learnt concept.
5. Discussion of what is different between the analogy and the concept.
6. Summary of the components of the studied biological concept indicating its important aspects.

2.6.2 Literature and Social Sciences

Teaching literature is influenced by processes that take place in philosophy of art, by research in schools of literature, by the sayings of creators and literary philosophers and in parallel by educational research processes in general, and in the field of learning programmes research in particular. To this should be added the influence of occurrences in the political arena, in social and cultural fields (Maslovaty & Iram, 2002). Reading literature enables people to achieve insights concerning their lives, both personally and culturally (Sumara, 2002). Reading a literary text requires active organisation of the different materials in the text that takes place in the reader's mind. This organisation enables the reader to construct meanings for creative work (Harshevet, 2000).

The constructivist approach in education recommends that in teaching literature, the prior experience and knowledge of the learners should be taken into account (Brooks & Brooks, 1993; Perkins, 2000). Intertextuality is a central component in understanding literature and culture in general (Allen, 2000). A person's life is constructed in relation to written, spoken, photographed and painted texts etc. The person's ability or inability to conduct a dialogue with them determines that person's belonging or not belonging to particular discussion groups in order to develop an intertextual thinking. Legitimation for associative thinking and recognition of the ability of the learner to construct associations are necessary to create a suitable learning atmosphere for literature. A study conducted among literature teachers in teacher-training colleges in Israel demonstrated that most of them do not see association as the most important thinking skill in the teaching of literature (Greensfel & Elkad-Lehman, 2002). In contrast teacher of social sciences compose 'curriculum stories' that constitute unifying and coordinating frameworks for the learnt knowledge (Gudmundsdottir, 1987).

2.6.3 Academic Literacy

Literacy requires a profound familiarity with the written language and awareness of its goals (Valdan, 2000). The concept 'literacy' relates to the individual's ability to use the written language of that individual's culture for different functions. 'New Literacy' (Willinsky, 1990) broadens previous interpretations of literacy: it not only deals with the broad entirety of cognitive skills – diagnosis, sorting, generalisation, selection, organisation, deduction, discerning hidden meanings, providing interpretations, applying critical tools etc., but it also turns attention to internal-emotional processes, involving the linking of meanings to reading and writing and to the learners' socio-cultural contexts, contexts in which these actions are anchored.

In order to construct learning programmes for the class, appropriate for all learners according to their different backgrounds (Ezer, 1992), the teacher should not only take into account the fact that learners have pre-existing

knowledge, but also its nature. It is essential to identifying the nature of this knowledge, since the teacher is then able to construct a teaching programme that directs the learners to exchange their pre-existing knowledge for other knowledge that is more meaningful. Bereiter & Scardamalia (1987) call this process 'knowledge telling'.

According to Zellermyer (1997) literacy in its broadest sense is not just 'knowledge telling' (Bereiter & Scardamalia, 1987), since the individual's ability to construct and exchange personal knowledge also enables the individual's personal voice and voices of others to be expressed. The New Literacy does not simply set its goal as providing a cultural residue for the future through linguistic forms, canonical texts and inalienable assets, but also enables the learner to encounter the strategies of experts and yet to acknowledge their own knowledge, allowing them to voice their own opinions.

The teacher's responsibility is not restricted to teaching the material, choosing tasks and stimuli and correcting and evaluating products, but also includes a broad range of functions: offering a space in which to deal with the process, reflecting difficulties and abilities and teaching the learners how to give and receive feedback.

The pedagogy of the New Literacy is also influenced by principles of the constructivist paradigm (Brooks & Brooks, 1993; Perkins & Blythe, 1994; Perkins, 1992). According to this approach the learner is seen as a person in a process of growth, who provides meaning for the world through a synthesis of pre-existing understandings with the new experiences. New Literacy perceives this learning as an act that occurs through a concrete experience, dialogue and reflection. The pupils' responsibility to learn broadens from being satisfied by memorisation and responding to requirements to realisation of 'self-management' abilities (Lazarson, 1999), that include the learners' effective exploitation of the offered instructional environment, efficient use of reflective tools, demonstration of willingness to invest in thinking about thinking, intelligent association between materials from different sources and their

application in different contexts, ability to provide and receive feedback and also the ability to present their works and to back them with evidence from their learning.

Given the present changes in higher education institutes, attempting to adjust themselves to changing socio-cultural demands, there are increasing calls for improvement of the learner's academic literacy; meaning the type of literacy that will answer the learners' needs to cope with academic situations in their daily living and at the workplace (Ezer, 1997). Literacy learning programmes are based on writing performances (Calfee & Warshauer Freedman, 1996).

In the 1980s a number of approaches began to develop in the teaching of literacy that recommended the development of learners' thinking within a supportive social context. These included approaches such as Process Writing, Whole Language and Authentic Assessment. These approaches suggest that teachers should construct their teaching programmes, on the basis of perceptions that encourage critical thinking (Calfee & Warshauer Freedman, 1996).

To summarise: different disciplines use different teaching methods and have different characteristics expressed when teaching and learning in these disciplines.

2.7 Chapter Summary

In the modern era, teacher-training relies on different perceptions based on various paradigms and orientations. The introduction of computerization into the education realm has led to change in the education system and consequently, also in teacher-training. Nevertheless it is important to remember that change is a complex process constructed in stages and entailing various possibilities. It stems from differing motives and has different components, and change does not always engender professional development of those involved.

Teaching and learning are very meaningful components of the teaching process and the integration of the computer in teaching and in distance teaching, in particular, constitutes a defining moment for these components. The teacher who teaches at a distance is required to fulfil several roles, which did not exist before. Teaching methods now rely more of the Constructivist approach.

Existing teaching practices are based on the traditional approach and see teaching as teacher-focused, in contrast to the pupil-focused viewpoint that is expressed in computerised teaching and learning. The 'teacher's presence' acquires a new meaning and is expressed as 'teaching presence'. The teacher becomes a forum learning leader and can choose different ways to guide the learning in this realm. Computerised evaluation also undergoes a transformation and assumes a different work method in comparison to traditional evaluation.

Distance teaching opens up many new types of interaction: learner-interface interaction; learner-instructor-content interaction; learner-learner interaction, and social presence. Although these options open up a range of opportunities for work methods, the teacher then has to decide how to best employ them.

The literature indicates that disciplines play an important part in higher education and that it is important to teach the knowledge construct of the different disciplines. **But does distance teaching through the computer influence, contribute to, impede or alter the teaching modes of teacher-educators' teaching the different disciplines at a distance?**

Although knowledge has accumulated concerning the subjects of interaction, organisation and management of teaching, data representation and communication tools of teacher-educators teaching at a distance there is still a lack of knowledge concerning the teacher-educators own viewpoints. Additionally, there is a lack of knowledge and identification of distance-teaching modes in relation to different disciplines and teaching practices in teacher-training colleges in general and in Israel in particular.

2.8 The Conceptual Framework of the Research

The conceptual framework of the research is based on four main elements: teacher-training, distance-teaching, academic disciplines and three dimensions of: representation of data, organisation and management of teaching and different types of interaction.

Teacher-training is based on different approaches to the training process (Zeichner, 1983; Feiman-Nemser, 1990a; 1990b). Teachers' professional knowledge is constructed from a number of components (Shulman, 1986a; 1987). A teacher, who becomes a teacher-educator in the college, undergoes a process of transition from a novice to an expert (Kolb, 1984; Bruner, 1996; Sternberg, 1997). However in the transition to distance-teaching the teacher again becomes a novice and needs to consolidate new teaching modes.

The teacher is a very professional person and the area that the teacher teaches is a well-defined discipline, which plays an important part in higher education (Yliuoki, 2000). Teaching the knowledge structure of the different disciplines is a pre-condition for the comprehension of the substance of those disciplines (Schwab, 1964a). It is therefore imperative that teaching should focus on the knowledge structure of the areas of knowledge and not just on the contents that they contain (Olson, 2007). In the transition to distance-teaching the teacher needs to adapt the principles of the discipline's teaching methods to the characteristics of the new teaching environment.

Research studies (Anderson & Ronnkvist, 1999; Mioduser, 2006) indicate that the number of teachers leading the innovative use of computerisation is not large and few teachers have introduced the use of the computer into teaching and learning. Additionally, according to Law et al. (2008) the extent of influence of information and communication technology in teacher-training depends on the pedagogic perceptions of the teacher-training students; these perceptions are formed during their training in teacher-training institutes, but few teachers are able to integrate technology in their teaching without seeing models of such teaching, experiencing it and imitating it (Flick & Bell, 2000). This is because pre-service teachers' experience serves as a significant basis for the ways in which they think and act as teachers (Korthagen, 2001).

Moreover, teachers' perceptions and attitudes regarding computers and regarding their roles in computer-assisted teaching and learning influence the ways in which they use the computer in the education system (Bruder, 1992). This means that it is very important to enable practice of distance-teaching during the training of pre-service teacher-training students.

The concept of knowledge has changed its status, instead of expressing possession it now expresses accessibility. It is no longer important what a person knows, but rather to what extent that person knows how to reach the required knowledge, how to navigate within it and how to be helped by it

(Simon,1982; Harvey, 1989; Harasim, 1993; McLuhan 1965) through the use of Internet language in a structure of concepts and content and this influences the manner of writing, the presentation of the information and the manner in which it read and absorbed (Lowe and Hall,1998; Hang, 2002; Man, 2002).

Teaching is multi-faceted and presents many options that range over a continuum from fixed and focused organisation of teaching to flexible and open teaching. In teacher-focused teaching the teachers place themselves at the centre and see the main part of their role as the transmission of knowledge. The teacher focuses on providing teaching and the contents that he/she teaches (Cuban, 1984; Withall, 1985; Lindblom-Ylänne et al, 2006). This contrasts with learner-focused teaching in which the learner is placed at the centre (Cuban, 1984; 1990). This choice of focus in teaching has implications for other characteristics such as: teaching presence (Anderson et al., 2001; Garrison and Anderson, 2004), the construction of knowledge according to the constructivist approach to teaching based on the theory of Piaget (1970) and the use of formative or summative assessment (Scriven, 1967) through computerised assessment (Thron, 2000; Lynch, 2002; Killion, 2002).

These dimensions are likely/need to provide a response to the learning of the adult learner (Knowles, 1984a, 1984b; Cercone, 2008). Moreover, the students are characterised by different learning styles so that the teaching methods may be more effective for certain people and ineffective for others (Felder & Silverman, 1993).

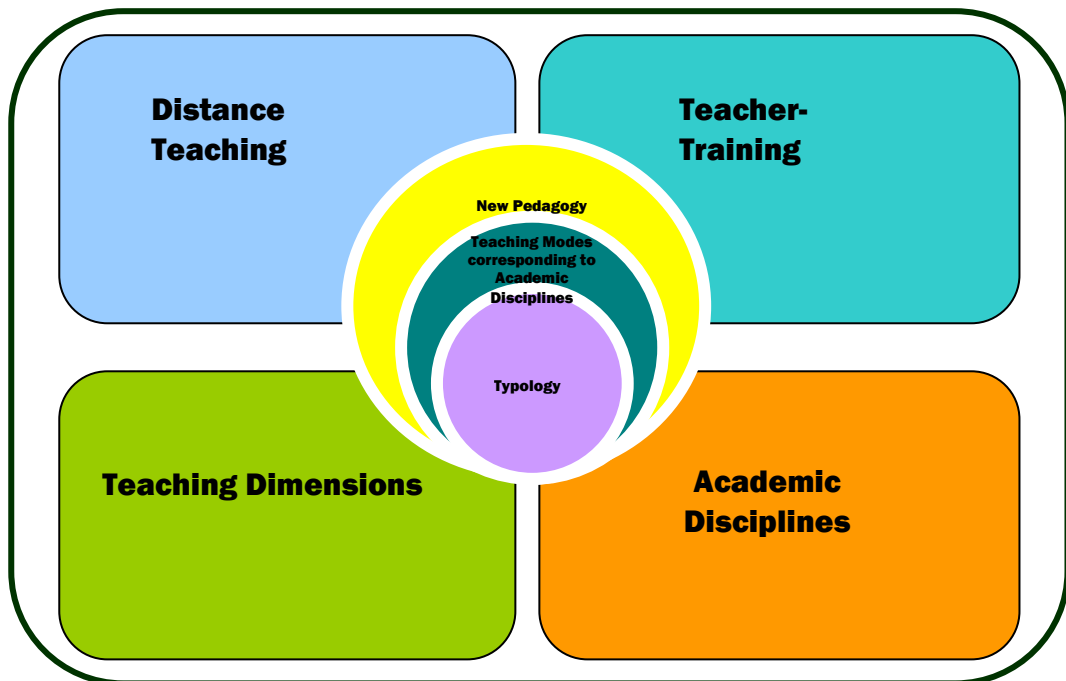
The virtual communication tools offer different options for data representation and for the creation of communications than traditional teaching and the teacher is required to redefine teaching modes in this new space. Paulsen (1995) suggested a list of functions that the learning forum instructor should fulfil and categorised them according to areas of responsibility. He determined a hierarchy of importance for each function in a category. In contrast Berge and Collins (1995) related to the functions of the forum instructors on the net from the instructor's point of view and categorised them into four areas: organizational, cognitive, social and technical. Additional important tools are: e-mail (Mabriot, 2005), presentations (Gomez et al., 2008) and digital portfolios (Lynch, 2002). In addition the familiarity with or lack of knowledge and the use or lack of use of computerised tools distinguishes between teachers with 'digital literacy' (Lanham, 1995; Gilster, 1997; Inoue, Naito & Koshizuka, 1997; Pool, 1997). Teachers are characterised in the area of organisation of information along a continuum between conservative and creative.

Virtual tools enable different interactions ranging along a continuum between a few channels of interaction to multiple channels. As noted interaction is one of the most significant components of the learning process in general (Vygotsky, 1978) and it is one of the foundation stones in the on-line learning process in particular (Moore, 1989; Rekkedal & Qvist, 2003; Anderson, 2003). The different possible interaction types are: Learner-instructor interaction (Moore and Kearsley, 1996; La Monica, 2001; Lynch, 2002; Mabrito, 2005); learner-learner interaction - this interaction leads to collaborative learning and dialogue between students (Slavin, 1990; Kagan, 1992). Combination of the three dimensions: organisation of information, organisation and management of teaching and the different types of interaction in a dialogue with technology form the two types of perceptions: computer-literacy and computer users.

This study was performed within a post-positivist paradigm. The research focused on one teacher-training college in Israel according to a qualitative research approach using a case study (Creswell, 1998; Yin, 2003). The research was conducted through an inductive process (Goetz & LeCome, 1984) emphasizing comprehension of the phenomenon through a close-up

view of the words and actions of the studied population (Patton, 1990). Validation was achieved through triangulation of findings from the different research tools.

Figure 1:
The Conceptual Framework of the Research



The figure above clearly shows the four components of this thesis. The conjunction between these components creates the gap in knowledge represented by the circle at the centre. A new pedagogy has grown to fill this gap, formed from the four models of teaching modes associated with specific disciplines and creating a typology of teaching modes.

Chapter 3: Methodology

3.1 The Research Aims

The aims of the research were to understand, to discover, to provide interpretation and to present what was common between and distinguished the teaching modes of teacher-educators teaching distance learning through the Internet in a teacher-training college in Israel. The research goal was to create an interpretative description, rich in details; 'a thick description' (Geertz, 1973) of the perception of their role as they interpreted it. In other words, the research was based on the belief that meaning could only be understood by those who underwent the events and situations of their lived experience and their practice. It was also the result of a '*desire to understand and not only to explain*' (Sabar Ben-Yehoshua, 1990, p. 16).

3.2 The Field of Knowledge to which the Research related

The research, conducted in a teacher-training college in Israel, examined teacher-educators' perceptions of their teaching modes, and can be categorised in the field of educational research.

Educational research is critical enquiry aimed at informing educational judgements and decisions in order to improve educational action) Bassey, 1999, p.39).

The research was an 'applied research', defined by Collis and Hussey (2003) as:

... research which has been designed to apply its findings to solving a specific, existing problem (p.13).

3.3 The Methodological Paradigm

Kuhn (1962) was the first to coin the term 'paradigm'.

Paradigms are universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners (p. viii)

A paradigm is a world-view, a general and broad perspective on the phenomena. It explains the phenomena in a general fashion, with a certain extent of simplification and an overview of the specific details (Lincoln & Guba, 1985; Guba & Lincoln, 1989). It reflects broad assumptions, interconnected one with the other, concerning the character of the studied reality. The paradigm provides the widest possible framework, within which the research takes place. The researchers act within the setting of this world-view (Maykut & Morehouse, 1994). The strength of paradigmatic thought lies in its ability to provide order to the studied phenomenon by viewing individual cases as belonging to a category (Polkinghorne, 1995). Each paradigm has its own characteristic epistemology and ontology, which form a unique way of investigation (methodology). Research approaches reflect the researcher's assumptions and relate to the ontological, epistemological and methodological issues (Guba & Lincoln, 1998).

The paradigm for this research was a post-positivist-inductive paradigm. The research proceeded from the data collection to the construction of theory. According to this approach the understanding of human social life is achieved through an investigation of individuals who interpret their routine existence in order to provide meaning for this existence. Those who research society must link these interpretations with the everyday situations in which people live. Social life can only be understood from the viewpoint of the participants themselves (Erickson, 1986, Hitchcock & Hughes, 1989). Goetz & LeCompte (1984) claim that data-collection, data analysis and a precise definition of the focus of the research process constitute an inductive process.

In the present research, the researcher wished to understand the situation by relating to the plentiful data but without enforcing a pre-existing understanding on the research conditions. The categories for the analysis were derived from the open interviews, from which the researcher gained knowledge to understand the organising patterns existing in the world under empirical study and not from predetermined research hypotheses. The researcher conducted an in-depth study, examining how the participants themselves perceived and interpreted their world and only then, on this basis, established meaningful assumptions (Seidel & Kelle, 1995, Merriam, 1998). The inductive investigation was characterised by its holistic consideration of phenomena (Stake, 1995). It aspired to understand phenomena and situations as complete entities (Rist, 1982; Henwood, 1996; Lincoln & Guba, 2000) and emphasised understanding through a close observation of the words and actions of the studied people (Parron, 1990). The world of day-to-day living, as it is seen from the internal perspective is the fundamental reality that the qualitative researcher needs to describe (Jorgensen, 1989). The researcher tried to 'capture' what people said and did, in other words the way in which the teacher-educators interpreted their world as this was expressed in their words and actions (Maykut & Morehouse, 1994). For this reason, the main focus of the qualitative research is not only consideration of a particular issue: the teacher-educators' perception of their role following their transition to distance-teaching, in a teacher-training college in Israel, but it is also the identification of the particular location or population in which this issue is expressed, where and among whom the phenomenon exists. Thus, during the research the researcher continually coped with the questions, how, where and among whom this specific phenomenon existed (Marshall & Rossman, 1989).

To summarise: the basic assumption in a qualitative research is that cultural and social phenomena can be learnt and completely structured if they are studied from the perspective of the participants who are actively involved in the phenomenon (Goetz & LeCompte, 1984).

3.4 The Case Study

The research was conducted as a qualitative research using one case study. Stake (1995) defines a case study as follows:

...case study is expected to catch the complexity of a single case. A single leaf, even a single toothpick, has unique complexities - but rarely will we care enough to submit it to case study (Introduction, p.XI).

Bassey (1999) adds:

Case study is study of a singularity conducted in depth in natural settings (p. 47)

... educational case study is a prime strategy for developing educational theory which illuminates educational practice (p. 57).

Punch (2005) contends that the aim of the case study

... is to understand the case in depth and in its natural setting, recognizing its complexity and its context. It also has a holistic focus aiming to preserve and understand the wholeness and unity of the case (p.144).

Creswell (1998) characterises the case study method as one of the five traditions of qualitative inquiry. He sees a 'case study' as the exposure and discovery of 'connected systems' or as the collection of meticulous in-depth details, including a multitude of rich data sources within the studied context. The context of the case includes the location of the case as a 'bounded system' within its environment, that may be a physical, social, historical, or economic environment. With the help of data collection, the case can be described in detail, while the analysis is performed according to themes or issues emerging from the interpretation of the case. This analysis is anchored within the rich data. At the concluding interpretative stage, the researcher searched for the meaning within the studied phenomenon and linked it to the findings and philosophical concepts and theories.

The choice of a case study presented the researcher with a number of challenges: she needed to identify the case and to what extent it was 'worthwhile' for the research and then to determine when sufficient in-depth

data had been collected concerning the case, and to decide on the boundaries for the case.

An additional issue which the researcher considered was whether to investigate a single case or several cases. This dilemma necessitated understanding that if more cases were examined there was a risk that they would be less profoundly studied. Nevertheless a larger number of cases would allow for a certain extent of generalisation (Shlansky & Alpert, 2007). It was therefore difficult to decide on the boundaries of the research (Creswell, 1998). The question 'What does this case represent?' (Wilson & Gudmundottir, 1987) is a question that the researcher asked herself and tried to answer from the beginning of the research when planning the research 'blueprint'. The researcher considered the 4 questions suggested by Philliber et al. (1980):

1. Which questions should be investigated, to be studied?
2. Which are the relevant data?
3. Which data should be collected?
4. How should the results be analysed?

The use of the case analysis research method was especially appropriate given the researcher's desire to connect the various elements studied in aetiological relationships, alongside an attempt to investigate and describe the phenomena. It was also the most suitable method because of the following characteristics:

1. The research examined the transition of the teacher-educators from traditional teaching to distance-teaching through the Internet, in the context of a single teacher-training college in Israel, in which the phenomenon took place during the years 2004-5 (Bassey, 1999; McIntyre, 1984; Zimpher et al. 1980).
2. The context included several varied variables: the types of courses, the learning disciplines, the teaching methods, number of participants, the use of different technological tools and work with different Internet platforms. It was difficult to delineate the boundaries between the phenomenon and its context (McIntyre, 1984; Yin, 1993; Stake 1995; Bassey, 1999)

The case study method allows investigators to retain the holistic and meaningful characteristics of real-life events such as individual life cycles, organizational and managerial processes, neighbourhood change, and the maturation of industries (Yin, 2003, p.1).

3. A direct examination of the phenomenon was conducted within the framework of a given location and time. The phenomenon was clarified within this framework, in parallel with a clarification of the context for its existence. The claim was that it was this context itself that contained the variables which could clarify the phenomenon, and that the boundaries between the two were not sufficiently apparent (Yin, 2003).
4. The intention was to attain insights, thoughts and perceptions from the perspective of the participant (the studied subject) (Zimpher et al, 1980; McIntyre, 1984), in other words to listen to and understand the different views of the teacher-educators with regard to their new teaching modes employed in teaching distance learning.
5. The research attempted to understand processes that the teacher-educators underwent as a result of the transition to their new teaching modes, which were expressed in different areas: organisation of data, interaction with their students and scope of management of their teaching.
6. The research needed to be conducted in such a way that sufficient data would be collected for the researcher to be able
 - a. to explore significant features of the case
 - b. to create plausible interpretations of what is found
 - c. to test for the trustworthiness of these interpretations
 - d. to construct a worthwhile argument or story
 - e. to relate the argument or story to any relevant research in the literature
 - f. to convey convincingly to an audience this argument or story

- g. to provide an audit trail by which other researchers may validate or challenge the findings, or construct alternative arguments (Bassey, 1999, p.85).

From the methodological aspect this research used a sub-type of the case study: the 'instrumental case study', because the researcher wanted to understand phenomenon and processes that the studied case represented. It is emphasised that the case was chosen since it is representative of a large number of teacher-educators in Israel and in many other states of the world who teach in this way and in addition the case constituted a model for those training to teach and for teachers in schools (Stake, 1988; 1995; 2000).

The choice of the case study methodology also provided support for the teacher-training process. Schon (1991) sees the use of 'case studies' in the research literature in teacher-training as an important means for professional development. He coined the term 'reflective transformation', relating to the process by which we examine the experience as expressed in the case story of others and transfer general lessons to the context and circumstances in which we work and to our attitudes and value-related and pedagogic world-views. The ability to generalise from a specific incident and to transform it into a representative case, with general meanings which can be transferred to the new context of the user – provides case literature with tremendous power as a tool for teacher-training. The new knowledge will have more possible applications in teaching work insofar as the described case has greater resemblance to the user teacher's situation.

3.5 The Research Framework

3.5.1 The Pilot Study

The research began with a 'pilot study' (Seidman, 1998) with a focus-group of teacher-educators from a number of teacher-training colleges in Israel. The findings from this group helped the researcher to understand the difficulty involved in entering colleague colleges for teacher training in Israel to conduct an investigation.

At that period a government committee named the 'Dovrat Committee' had been set up, the future of the teacher-training colleges was very vague, those involved were in a state of uncertainty accompanied by much tension and the heads of the college did not allow other colleges to enter in order to collect data from their personnel. The pilot study helped the researcher to decide who to interview, why, how, when and in what location. This insight led the researcher to concentrate on the one college in which she worked and in which she had convenient access to people, materials and for data collection.

Already at the beginning of the research the researcher decided to determine the focus of her investigation with two main goals in mind (Lincoln & Guba, 1985):

1. The focus would establish the conceptual boundaries of the research.
2. The focus would help the researcher to decide where and how to collect the data.

The research framework of a case study requires a careful investigation of the case's potential in order to minimise the cases of misrepresentation - an incongruent or false description and to maximise the evidence for the case (Yin, 2003, 2008).

Inspired by Stake (1995) a preliminary assessment of the process was performed to see whether the case was appropriate. And only after this it was chosen. The principle in a case study is not generalisation but rather to go into details – 'particularisation'. This means taking a specific case, becoming familiar with it and knowing it well, not with regard to the way in which it differs from others but rather examining what issues are involved in the case. It helped the researcher to widen the background by seeing examples in a more historic light; to identify broad problems in an interaction with people (Stake, 1995).

3.5.2 The Subsequent Research Process

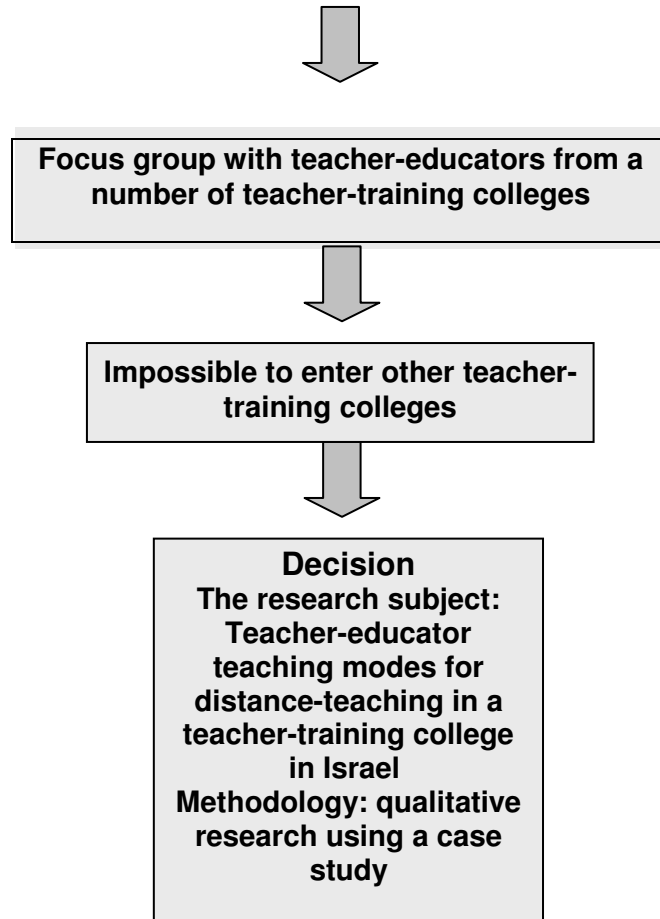
The research framework included five components (Yin, 2003):

1. The research questions
2. Propositions
3. Units of analysis
4. A design which would logically link the data to the propositions
5. The criteria for interpreting the findings.

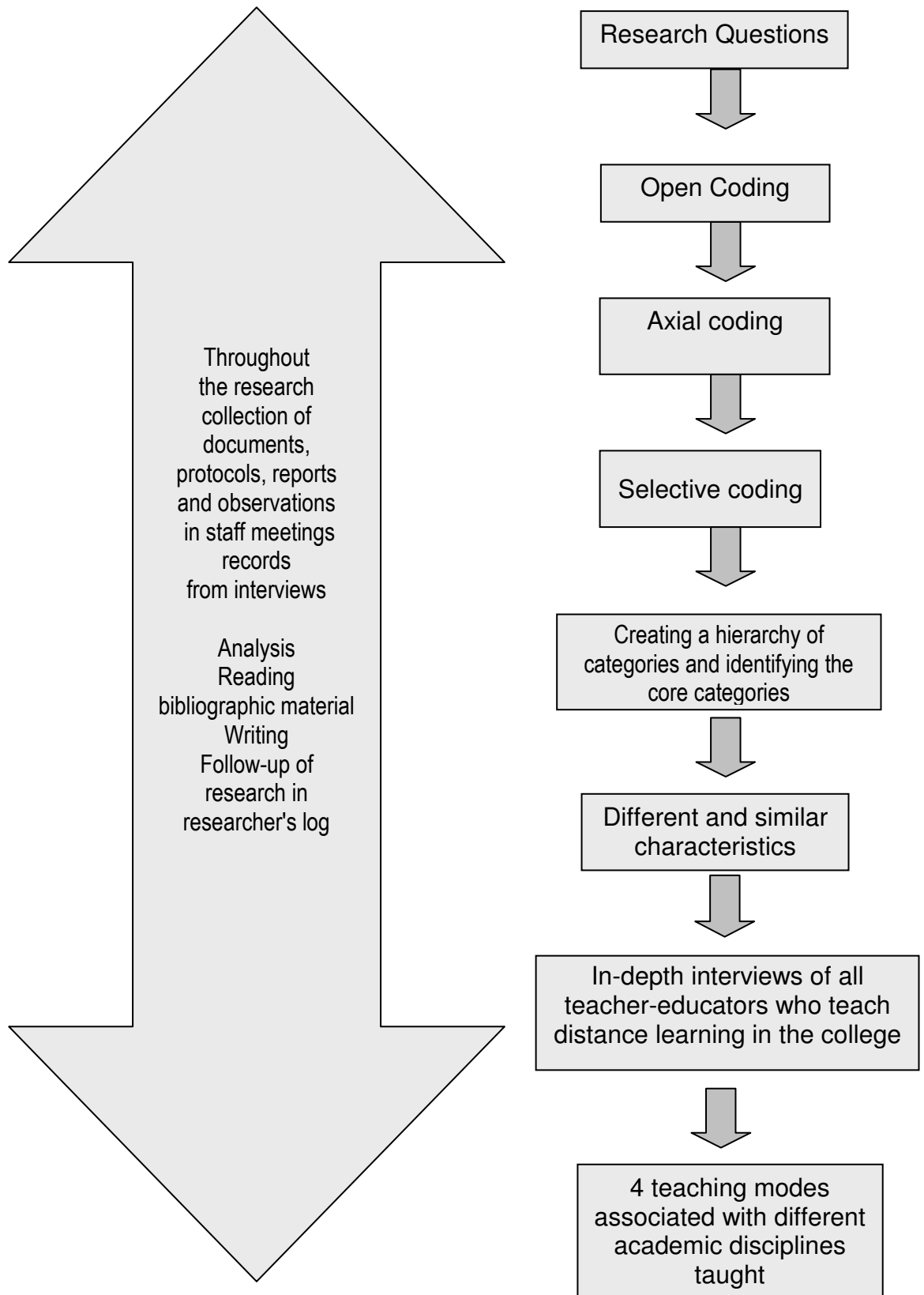
Flowchart 1 below describes the research process from the pilot study until the creation of the subsequent case study. Flowchart 2 below describes the research process following the pilot study.

**Flowchart 1:
A Graphic Description of the Research Process**

The Pilot Study



**Flowchart 2:
The Research Framework**



3.6 Research Tools

A variety of research tools were used in the research in order to make an in-depth study of the teaching modes of teacher-educators' who taught distance-learning.

Table 6 presents the research tools used in the research and their goals. The researcher continually sought for sources of information and considered which sources could be used. Thus all staff meetings, and meetings of the extended and specific staffs were recorded and used and the researcher was careful not to miss any of the meetings, going over all the written documents in addition to the records of the interviews with all the teacher-educators who taught distance learning (Mason, 1996) in order to reach the maximum information through the research tools.

A summary of the research tools is presented in Table 6 below, organised in rows and columns to enable comparison and engagement with the different categories of data in a simple methodical and graphic form (Gall et al., 1996).

Table 6: The Research Tools and their Purposes

Source of Evidence	Research Tool	Purpose
Teacher-educators from several teacher-training colleges in Israel	Pilot study – focus group	Initial familiarity with the subject. Choice of type of research
All teacher-educators teaching distance learning in the college where the research was conducted	In-depth interviews	To listen to the stories of the teacher-educators and how they perceive their role as teacher-educators teaching distance learning
Teacher-educators teaching distance learning in the college where the research was conducted	Follow-up interviews	To complete details which were not expressed in the in-depth interviews. To clarify insights that emerged from in-depth interviews and observations
Documents	Document analysis	To see the subject from a different angle, to gather information that was not expressed in the interviews or focus group.
Observations of staff meetings	Non-participant observations	To obtain information, to see and hear the examples and to collect information that could not be obtained from the personal interviews. To check with teacher-educators who joined the group later whether the models which were found in the research were also valid for them.
Daily records of all the research stages and data-analysis	Researcher's log	Interpretation, comments, development of the research and conceptualisation
Recording and writing up interviews, insights and questions that arose during the interviews and the observations	Field notes/ memos/ theoretical memos	Researcher's comments, ideas and insights as they arose during the interviews and observations

3.6.1 The Focus Group

A focus group was used for the pilot study in 2003 so that the researcher could clarify the research questions (Morgan, 1988), providing her with additional information and considerations to decide who to interview, why, how, when and where in the subsequent case study (Seidman, 1998). The session took place face-to-face in the Mofet Institute, in a pleasant room with 8 teacher-educators who used computerisation in five colleges in Israel. They spoke in the group about the fact that being teacher-educators who teach from a distance is a new role and differs from that which they performed in traditional teaching. The difficulty of entering into Israeli teacher-training colleges for research purposes floated up during these meetings.

The focus group eventually yielded information, which it was impossible to gain from personal interviews and thus enriched the subsequent personal interviews (Morgan, 1988; Fontana & Frey, 2000; Wisker, 2008). The advantage of using the tool of a focus group is that it provides an opportunity to observe a larger amount of interactions concerning the issue in a limited period of time (Morgan, 1988).

The researcher was aware of the difficulties which were liable to arise in a focus group; therefore she followed the advice offered by Fontana and Frey (2000) and Wisker (2008):

1. The researcher needed to be flexible, objective, empathetic, convincing and a good listener.
2. The researcher needed to elicit reactions from all group members in order to ensure thorough treatment of the issue, preventing situations where one participant would dominate the group and at the same time encouraging passive participants to participate.
3. In the management of the group's dynamics, the researcher balanced the role of interviewer-leader with the role of a focused mediator. As a group interviewer she simultaneously took care to raise the planned questions while remaining sensitive to dynamics that developed in the group interaction.

4. The researcher remained focused on the issue under discussion and did not digress to other topics that the group raised.
5. The researcher noticed and was sensitive to the cultural context, the place where the interviewees were situated, what they were asked, and at the same time remained aware of her own attitudes.

3.6.2 Interviews

The purpose of the interview in a qualitative research is to investigate the experience of the informants and to locate it within the social, pedagogic, organisational and technological contexts. The interviews enabled the teacher-educators to focus, for most of them for the first time, on meaning and revelation regarding their roles and to discover the emotional power of this subject for themselves. The interview was chosen as a research tool because it enabled the researcher to understand the personal viewpoint of the informants in depth and to expose their feelings, beliefs and thoughts on the research subject (Patton, 1990).

The interview is one of most prevalent way to try to understand human beings (Fontana & Frey, 2000). In addition the interview is a significant means to help people to expose matters which were previously covert – to express their perceptions, their thoughts and their hidden understandings (Arksey & Knight, 1999). The power of the interview is that it is almost the only method that allows the interviewer access to the meanings that the interviewees give to their actions and work (Seidman, 1998). The interviews enabled the researcher in the present research to expose and understand the interviewees' experiences through their language: their overt statements and the images that they provided. The interviews exposed covert knowledge that was not observable overtly but was also applicable and understandable (Seidman, 1998; Wisker, 2008; Yin, 2008). The design of the interview was such that it enabled the interviewees to get to know the research subject and its nature, while forming the context to understand the studied phenomenon and this

structure therefore enabled the informants to access the details and depth of the experience (Seidman, 1998).

Given the flexible character of the interview (Weiss, 1994) and the fact that it reflects the cooperation between the researcher and the informant, the manner of interaction and the dialogue that developed differed from interview to interview. According to Sabar Ben-Yehoshua (1990) in such an interview two complementary processes take place, which together constitute an advantage. The first is the process of adaptation and creation of a relationship between the researcher and the informant, a process in which the researcher encourages the informant to talk about the informant's world and creates a sense of trust, and thus enables a free flow of information. The revelation of the information was very important in the present research since personal information was transmitted that exposed the narrative, cognitive and emotional processes that the informants experienced in their work. The second process is the possibilities that are opened during the interview. The interviewees raised different issues that the researcher had not anticipated beforehand, but which were very important for the understanding of the studied phenomenon. All the interviews with the informants were conducted by the researcher herself. Each interview was an individual open interview which allowed for flexibility. The interview brought the researcher closer to the informants than any other tool. It enabled a social interaction to take place (Mason, 2001).

Different models of interviews were used:

- 'Open interviews' were conducted with all the college's teacher-educators who taught distance learning through the Internet, in 2004/5 when the research was conducted. Flexibility was enabled by a one and a half hour open interview for each interviewee. The researcher followed up matters mentioned by the interviewees, which seemed meaningful and this type of interview also allowed the researcher to check that the questions or answers were properly understood (Krathwohl, 1993). The open interview enabled a 'thick description' to be obtained (Geertz, 1973). As Denzin (2001) suggests, the researcher invited the informants to tell her broadly where they came from, how they had arrived at their role and

how they perceived the present in light of their past. The use of open interviews encouraged the informants to indicate what was most important to them, even the order of their statements was important because this was something that they had held in 'their bellies' (Spradely, 1979; Flick, 1988; Marshal & Roseman, 1989; Mason, 1996; Seidman 1998: Wisker, 2008).

- In some cases the interviews had the character of 'in-depth interviews'. This was a qualitative research totally dependent on the informants' words so that it was preferable to use an in-depth interview (Spradely, 1979). The purpose of the in-depth interview was to understand the experiences of others and the meanings that they provided for their experiences (Seidman, 1998). A pre-determined structure could not facilitate dynamism, flexibility and changes. Nevertheless, in each interview there were differences in the dynamics between the interviewer and the interviewee. The researcher therefore avoided unexpected interventions (Lincoln & Guba, 1985; Fontana & Frey, 1994). Each interview included a number of general subjects in order to assist the informants to expose their narratives and to present their meanings, attitudes and opinions (Krathwohl, 1993).
- The interviews began as open interviews and later became 'semi-structured interviews', where the questions were simple and developed in the conversation between the interviewer and the interviewee and a number of questions were asked during a divergence (Seidman, 1998; Wisker, 2008): 'What does it mean to you to be a distance-learning teacher? How did you arrive at this job? What is your work? What experience do you have?
- 'Structured interviews' (Wisker, 2008) were only used in cases where the researcher wanted to know particular information after she already had much material on the subject.

- During the data-analysis the researcher approached the interviewees to conduct a 'short follow-up interview' that focused on a particular role or a specific responsibility that the teacher-educators had undertaken or not undertaken, in which the informants explained how and why they acted as they did.

All the interviews took place within a framework of time that was convenient for the interviewees and did not exceed one and a half hours. The location, the date and hour of the interview were all chosen by the interviewee as convenient and familiar to the interviewee (Seidman, 1998). The interviews took place in the private homes of the interviewees or in a room in the college. Not in the room of the interviewee and not in the room of the researcher but in a neutral quiet place, a private room with a closed door.

During the interview the researcher made an exact recording of the interviewee's words, and the interviewees spoke fluently without any interruption on the part of the researcher. Sometimes interesting things were said by the interviewee, which were not discerned by the researcher during the interview. For this reason key words were recorded and later in the follow-up interviews the informants were asked about them (Seidman, 1998). The researcher transcribed the recording immediately after the interview, so that all the information was collected in writing (Stake, 1995).

3.6.3 Observations

Four observations took place during the year of the research. The observations recorded all the staff meetings of the teacher-educators who taught distance learning and in addition related to new teacher-educators who had joined the process, and constructed a course site but had not yet taught it. The observations took place in the teacher-educators' natural environment within the college walls.

Thus the researcher was able to cover events that took place in real time (Yin, 2003). 'Non-participant observation' was used, in which data was collected with minimal contact with the participants. No reciprocal relations were formed between the observing researcher and the informants. But in fact the very presence of the researcher during the session created a relationship (Spradley, 1980; Cohen & Manion, 2000).

The researcher chose a non-participant type of interview because she preferred not to be involved fearing that the research subjects would not cooperate; this was despite the fear that there is a risk that the non-participating observer may be distant from the group and have only a superficial externalised relationship, which might miss the nuances of the findings obtained (Spradley, 1980; Cohen & Manion, 2000). During the observations the researcher listened to and recorded the conversations in which the participants discussed issues, difficulties, dilemmas and innovations in the fulfilment of their roles as teacher-educators teaching distance learning. As noted, all the recordings were transcribed word for word (Spradley, 1980; Lincoln & Guba, 1985). The findings which emerged from the observations facilitated the construction of connections between the different parts of the research.

3.6.4 The Researcher's Personal Log

An additional research tool was the researcher's log.

The log is a tool, a way in to an ongoing exploration. From it we rethink, undo, and shape the ongoing research process and products (Ely, Vinz, Downing & Anzul, 2001, p.18).

The researcher used the log to write down her thoughts and involvement in the studied subject from the initial stage of thinking about the research subject, and including the research planning, collection and analysis of the data and ending with the final stage of writing up the thesis (Wisker, 2008). It helped her to have a better understanding of the research and of herself as the researcher (Van Manen, 1990) and acted as a tool to supplement the materials collected

with other methods of investigation (Burgess, 1984). The log maintained all the details concerning the research (Stake, 1995).

As noted by Ely et al. (2001) the log helped the researcher to construct the reality as the research progressed:

Reflective memos help us to critique our own work and to develop insights or directions. Reflective memos help us move the writing out of the field notes and into other forms (p.75).

The personal log also included 'field notes' collected informally during the observation or interview. These field notes are principally remarks relating to events, which for some reason were not recorded or registered during the formal stage of data-collection. Sometimes these were comments concerning the conversations or events that occurred before or after the formal data-collection stage or a remark concerning events which it was impossible to record with a tape recorder. The researcher wrote down these comments methodically during the interview or immediately after it. These comments were part of the reservoir of data and were interwoven in the analysis process together with the other sources of data (Jorgensen, 1989; Clandinin & Connelly, 2000); they helped the researcher to construct the categories and to see the interrelated connections between them (Charmaz, 2003).

The researcher also wrote 'memos' throughout the research which helped her to retain her ideas and ensured a continuous process of thought and discussion. The writing of the memos provided a tool to conduct a continuous wide-ranging dialogue with herself (Charmaz, 1990). When she wrote the memos the researcher actually laid out a foundation for the creation of categories by describing their characteristics, as they were reflected in the data (Charmaz, 1983). Writing memos initiated new ideas that sharpened and even changed the set of categories (Charmaz, 1995). It also served as an excellent tool to enable the researcher to conduct a reflective dialogue with herself concerning ideas relating to alternative categorisation, the creation of families of categories, the relations between the different categories and intuitive insights and theories.

3.6.5 Documents

Another tool was the analysis of documents, including protocols and the transcriptions of conversations in distance-teaching teacher-educators' staff meetings; also the protocols of technical support staff meetings and meetings of the managerial staff which discussed the subject of computerisation in colleges. It also included publications and research reports written by researchers and policy determiners in the institute. The documents were analysed by 'content analysis'. Yin (2008) believes that the study and use of these documents for research provides several advantages:

1. They are not always entrapped in pre-conceptions.
2. Documents serve to corroborate, to verify, to reinforce, to confirm and to contest proof from other sources.
3. They provide specific facts to verify, reinforce and confirm data from other sources.
4. They enable the researcher to draw conclusions from documents.
5. They enable the researcher to cover a large period of time, many events and many situations.

To summarise: the richness of this research tool contributed to the collection of a large variety of information from sources representing the research field. Further expansion of the following issues can be found in the Appendices: the research field (Appendix IIIA; the research population (Appendix IIIB); further consideration relating to the researcher (Appendix IIIC) and the informants (Appendix IIIC). Additionally the three official documents completed for this research in order to comply with ethical requirements appear in Appendices IIID, IIIE and IIIF.

3.7 Data-collection and Data-analysis

This sub-chapter outlines the research method, specifying the considerations that underpin the choice of the research method and methodologies, and providing a theoretical explanation of the method and the operative course of the research.

The choice of the specific method to be used in the research is a significant decision determining how the research can be conducted to provide the best answer to the research question. In a qualitative research, data-analysis is an inductive process (Goetz & LeComte, 1984; Trafford & Leshem, 2008), whose purpose is to provide meaning, interpretation and generalisation regarding the studied phenomenon (Strauss & Corbin, 1991; Maykut & Morehouse, 1994). Interpretative research requires that the researcher indicate how the interpretations relating to the actors (teacher-educators) were constructed and how they relate to meaningful activities of the participants and to the phenomena that were formed in the research arena, i.e. the teacher-training college in Israel (Miles & Huberman, 1994).

Striving to reveal the subjective meaning that the participants grant consciously or unconsciously to their actions is the main objective of an interpretative research. Daily life and the meanings produced by this life, become the objects of the research. In this research the subjects studied were the new teaching modes of teacher-educators teaching distance learning through the Internet (Schutz, 1970; Geertz, 1973; Blumer 1976; Woods, 1977). An interpretative clarification assumes that the social reality is always open to redefinition by those who participate in it, and is therefore not predictable (Miles & Huberman, 1994). Interpretative research is therefore not perceived as an experimental science that aims to uncover consistency, but as a science that interprets and clarifies.

Employing interpretative sociology of education enabled the researcher, to observe the processes occurring in the college close-up and in-depth, and to see how new definitions of the situation by the teacher-educators and all the surrounding participants, created a process of educational change through negotiations between them.

The interviews were recorded and transcribed in full. This transcribed material underwent processes of 'open encoding', 'axial encoding' and 'selective encoding', in order to derive theory inductively from the data (Hycner, 1985; Strauss & Corbin, 1991; 1994). The processing and analysis of the data was conducted by content analysis (Guba & Lincoln, 1983) which included a cyclic dynamic process, in which the stages of data-collection and data-analysis took place simultaneously. The researcher gave names to events from the data and continuously made comparisons between them, in order to decide whether they belonged to the same encoded group. As she progressed in the comparative process the unique theoretical qualities of the different categories rapidly began to be revealed (Glaser & Strauss, 1967). The encoding was conducted directly and accurately from the statement of the informants in the interviews and although this action was seemingly without interpretation, it was clear that even initial encoding is charged with the researcher's interpretations, as is the name-giving for the codes and categories. Shkedi (2005) notes that researchers consider all the codes and cases in the same conceptual perspective: the same category names are likely to appear in a large proportion of the cases. Since the analysis was conducted for each interview separately but the research in general was based on many interviews, it was important to take care that the initial encoding did not close the paths of future analysis when the researcher exposed the data for all the interviews.

The data were analysed into categories (Bryman & Burgess, 1994) through a 'backwards and forwards' action (Dey, 1993). This stage enabled the researcher to obtain a picture of the full potential of the gathered data (Shkedi, 2005). This is a conceptual process, since the new arrangement of the categories raised the data-sorting to a higher analytical level. Each interview or document was a unit of content and each sentence was defined as a statement (Guba & Lincoln, 1983). Throughout each stage of the data-collection, ideas or subjects were analysed and themes began to form as part of the construction towards the final report (Miles & Huberman, 1994). At this stage the researcher amassed more and more data and encoded them in accordance with the set of categories that she had listed. Thus she increased the internal validity of the findings by thickening the amount of data belonging to each category in such a

manner as to create a conviction that the structures and the criteria did indeed exist in the studied reality. Next, the researcher created a hierarchy of categories and located the 'core categories'. According to Strauss (1987) the core categories must be able to justify most of the variance in the behavioural patterns revealed by the criteria system. The core category is also responsible for the creation of an integration and hierarchy between the categories (Strauss, 1987). This action was conducted according to the criteria suggested by Strauss:

1. The category must be a principal category meaning that it is connected to as large a number of other categories as possible and to their characteristics.
2. The category must appear with a high frequency in the data.
3. The category must be connected in a clear way to other categories, connections which are not forced but rather self-explanatory to whomever is interested in the text and the criteria.
4. The core category must present clear connections with the conceptual and theoretical issues.

Data-analysis and data-testing are iterative – processes that are repeated continually until the researcher feels confident that the analysis of a statement is trustworthy (Bassey, 1999).

3.7.1 Referees

The researcher was assisted by two independent professional referees, each with a doctor's degree, who also served as researchers. They had much academic experience and knowledge in the field of teacher-training, one in the area of content and methodology and the other in the field of methodology. They read the collected materials and sorted them into statements employing content analysis to their holistic reading of all the interviews. Eventually, they reached findings which were in general similar to those found by the researcher.

3.8 Reliability, Validity and Generalisability

3.8.1 Reliability

The reliability of a replication of a qualitative research is by nature low and it is agreed that proposals for the replication of case studies are unrealistic for reasons connected with this type of research (Dey, 1993). In qualitative research it is usually impossible to expect that other researchers in similar or even identical situations can replicate exactly the findings of any particular research project (Schofield, 1989; Merrick, 1999). Thus the basis for the determination of reliability of a qualitative analysis is provided by the overt exposure of the conceptual perspective and the criteria of the researcher who conducted the research. In this research, the researcher revealed to her colleagues and readers how the research was conducted and how she made her decisions, so that readers can judge the research quality and test its logic and the reasonability of the researcher's thinking and actions (Arksey & Knight, 1999). Mason (1996) notes that in order to test the reliability of the research with its unique conceptual context and perspective, an explanation of some sort must be provided concerning the way in which the level of reliability and accuracy was attained.

The only place in which it was obvious that there was a high level of reliability was with regard to the recording and transcription of the interviews. The recording captured the exact words. In order to analyse the wording in the most accurate manner the speech was transformed by the researcher into written text (Stake, 1995; Seidman, 1998). Reinforcement of reliability was also obtained by the fullest possible records of the data (Yin, 2003) and by using the formal protocols which were produced in the research arena. The recorded protocols helped to ensure that phenomena which were revealed as exhibiting clear patterns were actually like this.

3.8.2 Validity

Validation means going back and forth between deduction and induction, between experience and reflection concerning the experience, between the data and the conceptual perspective of the researcher and the conclusions. What the researcher discovered must be confirmed by going back to the studied empirical world and examining the extent to which the developing analysis fits the phenomenon that was observed (Patton, 1990). Kirk and Miller (1986) noted that there is no one technique in order to validate a study, apart from a continuous personal interaction. We can never be completely convinced that we understand all the cultural meanings of each studied phenomenon. In this research the researcher tried to be sensitive and wise, and was equipped with a theoretical orientation and close relations and good faith (with the informants) over time, a systematic work model and pattern of behaviour that served as an effective tool for a thorough examination by the researcher.

The researcher was careful to maintain the chain of evidence for each step that she took in the research. She maintained all the transcriptions of the interviews and all other relevant material (Huberman & Miles, 1994). She kept all the documents, memos, analytic 'trees' and flow-charts which were made concerning the analytical process. The chain of evidence is composed of sections of data, in their various versions, from the raw stage of data-collection to the different stages of analysis and until the final findings and conclusions (Yin, 1981).

Maintaining the documentation for each stage of the analysis also enabled the researcher to cast doubt on herself and on her judgment and enabled her to test to what extent she was faithful to the data which were received from the informants (Strauss & Corbin, 1991). Mason (1996) emphasises that the validity of method and of the interpretation must be proved by a meticulous process of examination and restructuring of the path, by which the researcher thinks that the interpretation was reached, and there is no easy answer or short-cut in this process.

In qualitative research instead of the requirement for validity of prediction there is a demand for 'construct validity' (Miles & Huberman, 1994; Yin, 2003, 2008).

This relates to the extent of compatibility between the criteria chosen to represent the phenomenon and the concepts to which the criteria relate. In this research, the researcher used various sources and relied on a chain of evidence at the stage of data-collection and writing-up the thesis. She demonstrated that the meaning that she extracted from the studied situation, from reports and from reading had construct validity (Stake, 2000; Yin, 2003, 2008).

When the researcher presented the findings and her interpretation of the case study she took care, with regard to the construct validity, to show that the interpretations that she attributed to the patterns that she discovered, i.e. the second-level structures, were indeed congruent with the first-level knowledge which was collected during the research. Validity was attained when it was possible to demonstrate that the explanation was congruent with the meaning through which the participants constructed their reality and conducted their daily activities (Philipson, 1972). Validity was thus complete when the researcher's interpretations were validated and also when her understandings and interpretations of the studied reality – presented as 'second-level structures' – stood in congruence with the field data and with the research literature.

Qualitative researchers distinguish between 'internal validity' and 'external validity'. Schofield (1989) notes that, if other researchers who read their research data, sense that the evidence does not support their description of the situation then qualitative researchers should place serious doubt on the internal validity of their work. For this reason, the researcher maintained the entire chain of evidence of data and documents and took the advice of colleagues by presenting the data to them in a manner that enabled them to confirm (or place doubt) on the validity of the research. This process was conducted in an informal manner, but in a structured form (Merriam, 1985; 1998; Merrick, 1999).

Riesman (1993) indicates that in order for the process to be effective it needs to comply with the following conditions:

1. To make the information available for other researchers.
2. To make the research process with all its components manifest.
3. To provide a description of the way in which the interpretations were formed.

Finally Riessman (1993) suggests that the ability to convince others of the validity of a research is strengthened when the theoretical claims are supported by evidence from the informants' explanations.

'Internal validity' relates to the extent to which the explanation for an observed action is proved as correct in the studied context and it also relates to the question: to what extent are the chosen criteria indeed suitable to represent the phenomenon? (Yin, 2003). Additional internal validation is attained when the interpretation of the researcher receives the confirmation of the informants, in other words the findings are logical and acceptable for the informants (Miles & Huberman, 1994; Maykut & Morehouse, 1994). At the end of the research, the researcher presented the research to the informants before its publication. This contributed to the 'trustworthiness' of the research (Lincoln & Guba, 1985). Lincoln & Guba (1985) call internal validity – 'trustworthiness'.

'External validity' relates to the specific data-collection through which it is possible to arrive at generalisations that indicate a theoretical relationship (Yin, 2003). External validity is an additional stage in the validation process. It is used for cross-checking research findings with the findings from the professional literature, examining the existence of patterns of activity of others, and examining the generalisations made by the researcher. In the present study, the researcher explained her understandings to the reader through excerpts and quotations from the 'thick description'. In this way the researcher laid out the reality in which she conducted the study before her readers and her understandings and interpretations of this reality. Exposure of the findings shows the reader to what extent the researcher was 'close' to the informants and to the data that was gathered and the readers are also given space to

provide additional validation in accord with their own personal understanding or familiarity with the studied subject.

Validity was obtained for the interview when in a number of interviews the interviewee consistently repeated the same things in the syntax, made the same pauses in speech, and the same word clusters while the interviewer remained inactive. Thus, the researcher knew that interviewee was trustworthy (Seidman, 1998).

The extent of patterning that was revealed increased the validity of the findings and it was only revealed after the cross-checking of data from different sources. These patterns corresponded with the researcher's generalisations and interpretations which were presented as 'second-level structures'. When the researcher was required to reach a final synthesis, she identified certain 'key events' (Fetterman, 1989).

3.8.3 Generalisation

In qualitative research it is difficult to generalise from one research to another (Yin, 2003). This means that it is very important to pay attention to the context in which the research takes place, in order to examine whether it is possible to generalise the research findings to other similar times, places and populations (Shavelson & Towne, 2002).

There are researchers who believe that it is impossible to generalise qualitative findings and they see this as a limitation of this method (Merriam, 1985; Firestone, 1993). One of the most frequent criticisms concerning qualitative research voiced by quantitative researchers is that qualitative data-collection produces data that cannot be compared because not all the informants are asked the same questions in the interview (Strauss & Corbin, 1991). In response to this, Stake (1995) claimed that the true business of a case study is its uniqueness and not generalisation. The researcher in the present research took a particular case and studied it in order to know it well. Not how it differed from other cases, but rather what were its characteristics and its meanings. By

learning the specific qualities of the individual case, it is possible to understand the universal case (Simons. 1996).

Guba and Lincoln (1989) fundamentally reject the benefit of the concept of generalisation and external validity and claim that it should be abandoned as a research goal and replaced by the term 'transferability'. Stake (1995) claims that the qualitative researcher can organise the research so that most of the opportunities for naturalist generalisation can be attained. Accepting the path to generalisation as suggested by Stake (1978; 1995) leads to the conclusion that the consumer of research, the reader and not the researcher is the one who determines the extent to which the research can be generalised and so the onus of proof in qualitative generalisation is imposed less on the researcher and more on the reader (Marshall & Roseman, 1989; Peshkin, 1993; Firestone, 1993).

3.9 Triangulation

Validation was achieved in this study through 'triangulation' of the data from the different research tools. The researcher used various sources and different paths in order to see whether a particular phenomenon did indeed occur and in order to clarify its meaning (Stake, 2000; Yin, 2008). The use of different paths testifies to the researcher's intention to provide the object of the research with more than one interpretation. This variety enabled her to simultaneously present a multitude of realities. The use of different research tools in the present research, allowed the researcher to compose a picture with the 'thick description' described by Geertz (1973). According to Denzin (2001) a thick description includes the context of the actions, it represents the directions and interpretations that organise the actions, investigating the influences of the actions and presenting the different interpretations that can be given to actions.

Using triangulation the quality and precision of the data-collection was improved. Each source was checked against the other sources of data and interpretations that lacked sufficient cross-checked data to validate their explanations were deleted (Fetterman, 1989).

Triangulation provided the researcher with more holistic evidence of the studied area and validation of this area from varied aspects (Morse, 1994; Miles & Huberman, 1994). Using the strategy of qualitative research, it was important to collect all information that could contribute to the understanding of the studied subject, in order to create generalisations which would lead to the construction of new theory (Lincoln & Guba, 1985).

3.10 Ethical Issues

Detailed consideration of the ethical Issues involved in research in general and in this particular research and the ways in which the researcher dealt with these Issues appears in Appendix IIIC.

3.11 Chapter Summary

Interpretative analysis of the research findings was conducted through content analysis. The very fact that qualitative methodology was used meant that there was a low level of reliability and a high level of validity. Generalisation of a qualitative research can only be determined by the reader. The researcher increased the quality and accuracy of the data and hence their validity through triangulation of the different types of data.

Chapter 4: Findings

4.1 Introduction

The research examined the perceptions of teacher-training college teacher-educators in one Israeli college who teach through distance-learning on the Internet. The report concerning the informants' attitudes avoids any judgmental criticism and relates to the range of attitudes which were presented as legitimate perceptions. In addition it is emphasised that the report relates to the declared attitudes of the informants, **as they perceive and express them in their own words.**

Further on in this chapter the characteristic modes that emerged from the findings are described according to a number of dimensions. The researcher chose to describe each mode separately in this Findings chapter in order to highlight the specific uniqueness of each mode, so that the reader would be able to see a comprehensive picture of each type.

4.2 Characteristics common to all Teacher-educators

From the analysis of the findings it emerges that there are a number of characteristics which are similar for all teacher-educators irrespective of their teaching discipline and the teaching mode that they chose. Common features that emerged from an analysis of the findings, irrespective of the chosen mode, included: their motives for the transition to distance-teaching that stemmed from intrinsic and extrinsic motives; quality, type and level of the teacher-educators' prior knowledge concerning the subject of distance-learning, and their prior experience or lack of prior experience in this area. Even in cases where differences were found between these characteristics they were not expressed in the creation of the different modes or a connection relation with the teaching profession

4.2.1 Teacher-educators' Intrinsic, Internal Motives

Analysis of the findings showed that the teacher-educators tended to understand the importance and need for 'life long learning', learning and training for the teachers throughout his professional life, so that they would be promoted, would learn and if necessary would change and improve the work methods and teaching methods that they used. There are many varied ways in which the teachers learn during their lives: self learning, shared learning in an individual setting or an organised group setting. Thus the teachers, who adhered to a ritual of learning as a part of their lifestyle, devoted their summer vacations to learning and acquiring knowledge and experiencing new subjects. One of these subjects was the integration of technology in education, becoming acquainted with educational computer programmes, software, site construction and other virtual tools that could assist them to learn about the computerised teaching environment and thus become teachers who teach through this method.

*I feel that each year at least in the summer I need to learn something new that I have never learned. **So that once again I will have itchy hands.** So I went to learn the software 'Asound' and suddenly I saw ... and they talked about the use of the computer in teaching and that really interested me ... and each time I thought that I could do something with it in the class, so it's possible to take this to here and that to put there (Lee).*

Other teacher-educators had similar experiences and used the training process to clarify how this new knowledge could guide them to improve their teaching. Their personal willingness to experiment with anything new that was taught and their desire to find a use for it in their work, stemmed from their love of learning new things.

It has been like that since I was very small, and you know that I have advanced with that tool, I'm a type who learns (Avon).

A sense of social, cultural and academic responsibility to train future teachers contributed to their desire to attempt distance-learning. Looking around them they saw progress and innovation in the schools, the pupils' command of computer skills, the ample spare time that the younger generation devoted to the computer, the way in which young people learnt, searched for, and accessed information and the way in which they presented their work to the school teachers. They understood that this change had issued from the children and necessitated suitable training for future teachers, so that they would be able to integrate in this work environment and to guide the pupils to technological innovation, as a model for intelligent use of technology and its implementation in teaching and learning. The best way to bring the pre-service teachers to become teachers for the new technological era in the 21st century would be through a model that they would learn to recognise and experience by themselves. As professionals dealing with teacher-training, the teacher-educators felt it was their responsibility to reduce the digital gap and to provide suitable training for those who acquired the teaching profession as their life career, since maintaining teacher-training in the outdated format would not meet requirements for the future teachers' training process.

Exposure to the possibilities and potential which could be achieved through the computer opened a new window for the teacher-educators and they harnessed this potential as a channel to widen their sources of information, its scope and accessibility for their students, believing that they could thus expose learners to a more up-to-date relevant variety of information. For example, they were able to provide materials that until then had been difficult to use within the college walls because of the lack of accessibility, cost, heavy workload and physical difficulties involved in their presentation in a lesson.

*From what I saw of the new era of teaching and from what I read that it included, the children bring to school and are already skilled in [the use of] computers, so it is impossible to give them the teaching there that they once gave ... **so I thought that [this was] also [relevant] in the academic world, I needed to take the children's world, to improve it ... and to promote it in this field as well ... I thought that even I would***

*seem to be outdated if I didn't do this and if I didn't fit myself for the new age ... [I could use] the subject of database management for this possibility ... to simply reach different sources of information that had once involved much bother of going to the library, today their access and convenience ... is far, far greater and I said: **Wow! This is something that I can exploit for the benefit and advantage of my teaching**, so I did it (Palma).*

To summarise: the teacher-educators' transition to distance-teaching stemmed from a system of internal motives, such as: the acquisition of new knowledge and studies while they worked, their curiosity and their practical experience in the technological environment.

4.2.2 Teacher-educators' Extrinsic, External Motives

The external motives for the teacher-educators' transition to distance-teaching stemmed from the request or sometimes demand of the college management, heads of courses and streams.

That means, there were enough system constraints, they promised the students an on-line course and not a lot of teachers know what that is, so: you will do the on-line because you already know it (Milly).

The college adopted this policy because of market needs. It promised to provide the students in the post-academic retraining stream (a stream where students with a first academic degree usually complete their teaching diploma in one academic year), with distance-learning courses and thus they were able to attract students who lived at a distance, among them mothers of infants and students who worked long hours during the day in order to earn their keep.

How could we include more disciplines, because most of them learn for only one year, and [we understood that] the distance course would apparently relieve them from coming to the college, and it would be possible to put another course into that space and that's what happens in practice (Zinnia).

The new training programme was conducted during the year when the research took place. One of the components was the reduction of the number of days that the student needed to study in the college. The college needed to provide the learners with the same amount of knowledge, direction and teaching as they had in the past using a smaller number of study hours in college. The solution was to reduce the amount of hours studied in face-to-face meetings and to transfer them to distance-learning. This alteration meant that many teaching hours were exchanged for distance-learning and the teachers who taught these courses were required to change their teaching environment.

In fact, when we began the project ... we received 3 annual hours for this didactic lesson, where two hours were face-to-face and one hour was an on-line hour ... in other words I was constrained, I needed to organise myself in order to teach that weekly hour in distance teaching, and a weekly hour in Year A is very, very significant (Avon).

4.2.3 The Acquisition of the Necessary Knowledge

In the main, the acquisition of the knowledge that they needed to become distance-learning teacher-educators was not conducted in an orderly organised manner according to a predetermined learning programme. It also had not been included in the learning and training programme that the teacher-educators had undergone years ago as part of their academic teaching programme. Moreover, in all the streams where the teacher-educators acquired the technological knowledge and skills to become distance teacher-educators, there were no special channels for training in the particular specialist disciplines that they taught.

Three main avenues, used by the distance teacher-educators to acquire knowledge of how to teach distance-learning emerged from the findings:

1. The knowledge acquired independently: acquisition of knowledge by studying the sites of colleagues. They tried to understand the rationale of the sites, to look at their design and organisation and representation of materials. In the main this was done by entering a site without contacting

the teacher who constructed and taught the site. During their surfing into the sites of teacher colleagues in Israel and abroad they tried to learn, to analyse and to build by themselves. They also criticised the sites and work of others. During this process they also learnt and corrected themselves and saw this as a process of self learning for the subject. A motive that many teachers repeatedly expressed was that they had learned the subject alone, independently, without any organised framework or structure. Most of the learning and knowledge acquisition took place as experimentation and in many cases as part of a process, when they had already constructed their own site and taught a distance course in practice.

No one taught me; I taught myself ... I began ... to think of what would be good for distant students, what would not be good. That means how I could construct the lesson so that it would be better ... simply because I saw other sites and entered the sites and saw how the site was constructed, I saw what I thought was appropriate and what didn't seem appropriate (Milly).

An additional way was to learn from family members, including young children. Often the learning took place while they were teaching, in order to provide a response to problems or a specific need and in contrast to other areas. Here their own children contributed and helped their parents to acquire knowledge despite their young age.

Then I sat with my child (Milly).

2. Knowledge acquired within the college framework from pedagogic and technological support by the college Computer centre, that later attained specialist status and became the college's '*Centre for Digital Learning*'. The teacher-educators received advice, support and assistance from pedagogic counsellors who supported them throughout the process, and also from the technical support staff who helped to construct the sites and gave technical assistance. Thus the teacher-educators acquired more experience and confidence to fulfil their new role and also received a response and supplement to their

lack of knowledge in this area. In addition the Centre conducted sessions for on-line teachers on Fridays (a free half-day in Israel when there are no academic studies) in order to teach those who had recently joined this field and to show them innovations in the technological and pedagogic fields, and also to provide support to the more 'veteran' distance teachers.

And then you helped me a lot and taught me, and the manageress of the support centre and her vice-manager helped with all sorts of conversations, I was really confused, dazed, they really organised the boxes for me, where to erase things, where to put the emphasis and actually I had to conduct an orderly acquisition of information all the time (Lee).

And we had those meetings every Friday (Milly).

3. Knowledge that was acquired from external bodies outside the college. Training obtained from the Mofet Institute The Institute conducts very many seminars, meetings and workshops on different aspects of computerisation and presents different approaches regarding its integration within teaching and learning. The teacher-educators took part in these activities, met with their colleagues and thus over the years acquired new knowledge. Some of them began to implement it a short time after they acquired the basic tools and some needed a longer more detailed training process.

Some of the teacher-educators acquired their knowledge and experience from the university. In parallel to their work they studied for advanced degrees in the university. These teachers acquired academic pedagogic and technological skills in this field, and also experience in distance-learning during their training. When they began the process in the college they already had theoretical knowledge which they felt provided the necessary knowledge to become distance teachers.

The transition to on-line learning was very natural ... in the university I studied the courses of ... all the big names – they talked about integrating computerisation, you understand that for me all the theoretical part, everyone speaks one language (Fay).

As noted three main channels were used for the acquisition of knowledge: the teacher's independent learning, the assistance of family, and support systems within and outside the college

4.2.4 The Desire for Change

All the participants in the research noted their need to make a change in their teaching. They felt that they underwent a transition when they made the change that they needed to make in practice from traditional teaching to virtual teaching. They all emphasised that their new job necessitated characteristics, work components and practices that they did not have before. They all agreed that a distance teaching and learning course necessitated different thinking, organisation, performance and a different teaching method. It required continuous appropriate, ordered, organised and comprehensible training for the teaching staff from a pedagogic viewpoint and not simply the narrow technological viewpoint. The teacher-educators' self-learning regarding distance-learning reinforced their need and recognition that there should be special training for the transition to distance-teaching, that they needed to become acquainted with it, and that its characteristics, advantages and disadvantages and its suitability for the teacher-educators should be learnt.

*I think that just as you need to learn how to be a teacher and just as I think a teacher needs a lot of studies, **in order to teach distance-learning you have to learn.** To learn how to construct sites, not to construct them technically, because that seems less problematic to me because they have courses about how to construct a site technically. I mean how to construct a course so that it will be constructed for the Internet. In my opinion that's an expertise (Avon).*

I needed to re-invent myself as a teacher ... how to react with humour and to react to everything (Lee).

Even after undergoing the transition to distance-teaching, the teacher-educators all wanted to receive regular assistance, support and help from the system, as part of their job conditions in the college. They expressed a desire to build together with an 'ideas' team that would help them to plan and construct and provide feedback, since they saw their learning as learning for a lifetime and so they wanted a supportive organised setting within the college throughout their work.

There should be a professional group that would meet very frequently and conduct a discussion after learning, about the learning and all this would of course be part of our job (Eileen).

*That means that it's necessary to prepare the administrative aspect for such a course ... There is cooperation throughout the college in many aspects ... I **manage half the world** so I deal with a lot of things that overlap and are connected to moving things and how to conduct this matter. It's not actually [just] coming to teach (Shandy).*

The change in the teaching environment implemented in the studied college influenced a change in the teaching of the profession of distance teaching in other educational institutes. Some of the college's teacher-educators have taken this change to other places as well. As a result of their own transitions to distance teaching, they have also initiated change in traditional courses that they teach. They testify that this transition to a distance teaching environment has led to a change in their thinking and a change in their didactic and pedagogic approach as teacher-educators. Their entire teaching and professional approach altered.

*The change also occurs in the field of lesson construction. Today I construct the lesson completely differently. **My didactic thinking is completely different, and my pedagogic thinking is completely different** ... my attraction to computerised teaching ... caused a decisive*

change in my work methods as a teacher in high school in recent years (Tad).

And then I understood that although I had come to the meeting with a syllabus for the course of the previous year, I had delivered it face-to-face, and this wouldn't simply be a translation into another language but it would be another course (Kirsten).

All the teacher-educators were exposed to a new world of knowledge and new communities. They broadened their professional community because of their easy access to a variety of virtual communication channels and contacted similar interest holders, exposing themselves to a larger broader community that they could not have contacted in any other manner.

*I suddenly encountered people with a Master's degree from Tel Aviv University in my lesson, within the on-line lesson, and then she told me that I used certain definitions now but I that needed an academic reference for my work to indicate where I had taken them from? All sorts of reactions and questions like that which meant that the fact that the site is open has an effect even outside the college ... **but I learnt something new**, meaning that as a result of her question I opened a portal for a subject that I hadn't known previously that somebody else dealt with. So this is also **a sort of updating from within** not through the portals or the content list of the latest journals and somehow the outcome is that you exist in the 'here and now' within a sort of immense community whose dimensions you don't even know how to define and its not a matter of ego at all, it's a matter of curiosity, a need to be in contact with more and more and more and more people and subjects in your area (Kirsten).*

As noted above, the teacher-educators' transition to distance-teaching influenced their work mode even for other courses that they still taught according to the traditional method and widened their interaction with communities with which they were previously unacquainted or which were previously inaccessible for them.

4.2.5 Section Summary

Analysis of the data revealed a number of common characteristics that contributed to teacher-educators' transition to distance-teaching in one teacher-training college in Israel. The themes that emerged for all the teacher-educators were not connected with the typology of modes identified from the findings or with the specialist disciplines taught by the teacher-educators. The transition to distance-teaching stemmed from the teacher-educators' internal personal reasons since they wanted to learn, expressed curiosity and wanted to progress, and also from external factors: the desires of the college management and other function-holders.

The process of acquisition of knowledge to become a distance teacher-educator was not predetermined and structured. Each one of them chose a particular path or number of paths in order to learn the skills. There were those who chose independent learning, learning within an organised internal or external academic setting or the help of family members. The transformation that they underwent led them to widen the community circles in which they became active and to change their work modes even in the courses where they continued to teach according to traditional methods.

4.3 Teaching Modes of Teacher-Educators working in Distance Teaching

An analysis of the findings indicates that four modes of on-line teaching were used by the teacher-educators. These modes represent exclusive teaching styles including different methods of using technology to serve pedagogy. The manner in which the on-line teacher-educators perceived and realised each dimension of their work created the difference between the different modes.

The mode types that were found are in complete affinity with the different teaching disciplines and are differentiated by the different ways that they use technology. Three of the models were also found to be compatible with the different learning modes of the students. In other words, it was found that each mode includes an integration of specific characteristics that were employed by teacher-educators from the same discipline.

Each mode is characterised by three main dimensions: organisation of information, organisation and management of teaching and manners of interaction with the students. The extent of activity and extent of use of technology employed in each of these dimensions influences the status of the teacher-educators, so that they can be defined as either 'technology users' or 'having a technological-orientation'.

Each dimension includes the following subjects:

1. Organisation of information: according to the research findings the organisation of information was characterised by multiple layers of information as opposed to the use of few data representations. The use type is connected to the extent to which the teacher-educators search for new technologies in order to advance their teaching. Technology enables teacher-educators to use different techniques from reading and writing of texts to a wide range of representations adapted to different learning contents and to learners' different learning styles and skills. Thanks to the contribution of technology through the use of presentations, recorded lectures, illustrations, questions and answers (Q & A), the teacher-educators could construct a rich body of data representations in distance-teaching.
2. Organisation and management of the teaching. According to the research findings this included: arranging the teaching and learning, types of tasks that would be represented, assessment, planning the site and the date for uploading of materials on the site by the teacher-educator.

3. The character of the teacher-learner and learner-learner interactions: the research examined the type and strength of the interactions woven between the teacher-educators and the student(s) and the interactions between students. The characteristics of the interactions were examined in relation to a number of themes: the pattern of attendance in the forum, encouragement of group interaction, and support for the individual, areas of activity in the face to face sessions, non-academic support for the student, and technological assistance for the student.

The research does not intend to indicate that a particular mode is more favoured than another mode. All modes have advantages and disadvantages and the researcher only wished to describe them, as they emerged from the findings and her interpretation.

1. **The Lear 'Museum' Mode - Representation:** a variety of data representations: teacher-educators who used this mode prepared the site in a form resembling a museum archive. The main use of technology was for representation and to provide a different learning method for the same subject. Learners surf and explore within the wealth of materials and choose where to enter, learn and experiment with some or all of the options. According to the research findings, this mode characterises teacher-educators who teach scientific disciplines: statistics and natural sciences.
2. **The Interactive 'Mary Poppins' Mode – The Personal Relationship:** Teacher-educators who used this mode emphasise their relationship with the individual and the need to provide a response to his needs. There is an obvious emphasis on interpersonal interaction between the teacher and the students. This interaction is expressed in their daily relationship through the virtual sending and receiving of many written texts, corrections and improvements. According to the findings this mode characterises teacher-educators teaching the discipline of literacy in Hebrew and English.

3. **'Puppet Theatre Operator' – Organisation:** Teacher-educators who employ this mode exploit the potential of the on-line environment in order to supervise the learners' work and their own work. They develop the planning and organisation and management of teaching and learning in order to create greater efficiency, for themselves and their students. Organisation and management are applied both to organising the learning materials and also for the preparation of a detailed studies timetable for learning and the performance of tasks. According to the findings, this mode was employed by teacher-educators teaching education disciplines who had used frontal teaching in the past.
4. **'Mother Goose' – Holistic:** The teacher-educators who use this mode are like 'big mothers'. They take care of all teaching, learning, education and social facets. Because they have a holistic perception of their role as teacher-educators, they therefore have a sense of responsibility and need to provide a response to each student. They take care of the individual, including the organisation, management and treatment of all technological needs. In this mode all the above-mentioned dimensions (interaction with the group and the individual learner; a wide variety of data representations; organisation and management of the learning) are given the same extent of importance. It was found that this mode was adopted by teacher-educators of education and literature who had previously taught in workshops.

These four modes are now presented in detail below. The dimensions they include are set out in identical order for each mode with emphasis on what is unique in each mode. The dimensions are: data representations, organisation and management of teaching, manners of interaction and extent of dialogue with technology.

4.3.1 The Representation Mode – characterising Science Disciplines: the 'Museum' Mode

The findings show that teacher-educators who use this mode harnessed a combination of sophisticated technologies to present a variety of data representations. They used means from a range of possibilities that could not be presented and learned in the traditional classroom. They offered a rich learning environment for the student who functioned as an independent learner and enabled the learner to surf through the wealth of data representations choosing the best and most appropriate presentation for his ability, skills, learning style, inclinations and technological aptitude.

Two teacher-educators who taught scientific disciplines were found to use this mode. Shandy taught statistics in a course for more than 300 students divided into sub-groups. Milly taught natural sciences in a course for 20 students. Despite the extreme difference in size of the groups taught by the two teacher-educators the organising axis of their work remained the broad use of a variety of data representations.

4.3.1.1 Creative Data Representations

The learning environment that they prepared included different types of representations: pictures, a dictionary of terms, a forum, lectures and recorded explanations, tests for the students so that they could examine the tasks that they had prepared by themselves, revision tests and use of exercises, video-films and presentations to summarise a subject, and reading of excerpts from professional journals.

Helped by the use of 'American (multiple-choice) examinations' with a choice of pre-defined solutions, they guided the students to practise the same material several times. The use of the technique of repetitive exercise of the same task enabled the students to learn the new learning material without exposing their level of knowledge before the entire community of learners. In each such experience they were given a grade and had the option to repeat the task again and again until they managed to gain a high grade. This work process had

advantages for organisational, pedagogic and psychological aspects of their work. The teacher-educator did not devote much time or additional effort, the successful students were not held back by the weaker students. All the students could practise and test themselves many times. These teaching and learning processes enabled a single teacher to cope with a large number of course students, saving the teacher's time for examination of their work.

Both teacher-educators thought it important to use a variety of data representations since they allowed them to advance and achieve a number of pedagogic aims.

1. Adaptation to the learning style of each learner. As a result of the variety the students were able to become familiar with the materials and to choose those which were suitable and desirable for them. The many repetitions which appeared in different forms prevented boredom for the students enabling them to revise the learnt contents in different manners; during this process the students' ability to continually learn new subjects grows while they express curiosity, interest and pleasure. The representations that they presented to the learners enabled the students to feel 'comfortable' with the materials.
2. Appealing to and activating an additional sense for the learner – the sense of hearing. The students watched explanatory recordings many times. They listened to the explanations of the new terms again and again.

Then I recorded lessons ... another way to learn ... through listening ... it gives the students another dimension for a live lesson (Shandy).

3. A means to teach and explain abstract terms. Since part of the learning material included the acquisition of professional terms which were new for the learner and often difficult to understand and internalise, they presented each new term in a variety of representations. To the extent that the students found it difficult to understand using one method they

were able to learn through an alternative method that was able to support their comprehension.

4. Support and encouragement for independent learning. Although they supplied the student with all the learning materials the work of learning is still imposed on the students and so they guided them to become independent learners.

Since I teach things that are very abstract and in a language with which they are unfamiliar, that they encounter for the first time, I had to present each term in very many representations in order to respond to all their possible forms of learning ... here they need to learn and use their heads and they don't have any alternative.
(Shandy)

5. The accessibility and variety of materials enabled the learners to deal with what was important and to avoid investing time and effort to obtain learning materials.
6. Using Internet links they exposed their students to a very large amount of up-to-date professional material. They guided the students to a large wealth of materials that could be found in on-line professional journals. They widened the knowledge resources, making them available for the students during the course, leading them to read and continually keep up to date with new materials presented by the international community of researchers with easy access, saving time in searching and locating materials and of course with no financial cost.

Since most of the articles are on the Internet, distributed freely, most of the scientific journals ... are open to a wide audience on the Internet, so I simply add a link (Milly).

They wrote in a friendly language in order to overcome the lack of physical contact. The variety of representations enabled them to write in a number of ways and explanations so that the materials would suit the entire student population. In this way they tried to provide a response to the range of students

so that each student including those with learning disabilities or new immigrants could cope with the contents and the lesson subjects.

I had a very strong sense of responsibility so I wrote to provide them with all the possibilities, in a consultant language ... its also in a friendly language so that it will be pleasant for them to read as if it were a personal language (Shandy).

To summarise: the use of a large variety of possible data representations contributed to the adaptation of the learning mode to the difficulties of each learner and encouraged increased activity of the learner's senses. They used different means to help the learners acquire knowledge regarding abstract concepts, providing support and encouragement for independent learning with wide and easy access to the corresponding learning materials and practice through a wide variety of questions and tests for learner's self-examination

4.3.1.2 Organisation and Management of a Fixed and Focused Order of Learning

Shandy and Milly believed that the way in which they planned and constructed the site, its method of organisation and their ability to navigate within it were very important. Since they did not see the student's faces and their body movements and reactions, the structure needed to be clear in order to enable the users to find their way and to be able to surf easily within the site. This approach led them to devote much thought and time to the planning and organisation of the site. Since they prepared all the materials beforehand, they had to consider every detail, to envisage the difficulties the learners could expect, how it was possible to solve, to guide and to prevent misunderstanding, or the student's 'stumbles'. They could not rely on spontaneity and when necessary had to be able to explain, demonstrate or present things in a different way. They had to present a solution for all difficulties and dilemmas which could be foreseen beforehand. A large proportion of the solutions were expressed in the abundance and variety of representations. In the prior organisation and planning they employed thinking and consideration for each

component of the teaching, and the learning materials and searched for every possible expected difficulty. This necessitated more order, far more than when they taught in a traditional classroom. This complexity was overcome by the provision of a clear explanation with links to sites where it was possible to download supplementary software, which would support the different representations and that could be seen well from every computer and every screen.

The examples must be within the site, 'built-in' in the studied text, they can't be suddenly spontaneous ... In distance-learning it has to exist from the beginning, I mean I have to think about all the options of forms of learning that the students can do or that are effective for them and to prepare for them beforehand. It's difficult (Shandy).

During the academic year they were occupied with 'site maintenance' including daily entrance into the forum, follow-up of task performance, treatment of students' 'exceptional problems' and in very rare and unique cases, introducing or altering learning material. They thought that every change that they made was very important. Since the students did not meet with them, every alteration, addition or removal of materials could be critical during their process of understanding and learning.

During the semester I answer the discussion groups. I answer letters, meet in face-to-face sessions ... that is my work, while the main part of my work is before the course (Shandy)

To summarise: the devotion of thinking and practical efforts to organisation and management of teaching led to a fixed and focussed teaching style. The need for this strategy emerged as a result of the lack of face-to-face meetings and an attempt to predict the difficulties and misunderstandings that the learner might encounter during the course.

The main part of the teachers' work was in the planning of the site and the efforts to upload materials before the beginning of the course, while alterations were very rarely made during the course.

Providing Uniform Tasks

The two teacher-educators who used this mode were careful to ensure the performance of regular tasks by all the students. They asked each group of students to present the tasks on a specific uniform date. They used this approach for a number of reasons:

Firstly, so that they could supervise the students and know that they had indeed studied and gone over a particular learning unit.

Secondly, to help the students become independent learners, but nevertheless, ensuring that they would be able to complete their studies by the end of the semester. The determination of a timetable for task submission dates supported the learners' planning, and division of the material that they had to learn each week enabled them to complete it all during one semester. The easy accessibility and the abundance of materials provided the learners with the ability to learn how to steer themselves and to focus on the important substance.

*Everything is actually constructed according to the lesson that they were meant to study in the class or laboratory. Each lesson has its own subject ... its own date, its own task and the final date for submitting the task; everything is of course calculated accordingly. **It's very structured and it has a logical order** ... they have points for each task, each task receives a grade ... they can also work at their own pace, on the condition that they submit it before the deadline... yes, yes I know who sends it on time, who sends it late, who sends it corrected, they write it for me after correction (Milly).*

Shandy explained a dilemma concerning assessment, relating to the assessment of tasks. Since she believed in using a wide range of data representations, she believed that the tasks should also reflect this spirit. But since the course had multiple participants she was unable to examine the tasks with open questions. She said that she made her choice according to the constraints of reality and not always because of pedagogic considerations.

The site is much richer than the book, there are ... American exams and I have given the answers. Then they asked me why this was the answer so I added the reason and an explanation for the answer ... Since I have 320 students the tasks are closed tasks ... you have tasks that you can use to test them or closed tasks that the site examines ... they can receive the grade easily for tasks. Even if they do the task and choose to do it a second time they ask me to re-open the task and to do it again until they receive a grade above ... It is a difficulty within the site. I continually deliberate in relation to the tasks, whether it is O.K., whether to give them open work or not – all the time this deliberation exists (Shandy).

To summarise: these teacher-educators provided tasks with uniform content and deadlines and the possibilities offered by the computer, help them to present them successfully. This strategy allowed them to supervise the independent learner. In a course with few participants this phenomenon appeared as the result of the character of the course and the teaching mode in contrast to a course with many participants where the size of the course dictated that the teacher-educator needed to relinquish power and strength and to permit personal contact only with 'exceptional' students.

Formative and Summative Assessment

The variety of data representations served the teacher-educators as a flexible means to assess the student. They used compulsory tasks as a way to learn. Using tasks the learner was required to progress and learn specified material and the tasks served as a way for the teacher to supervise the learning. The tasks were milestones for progress in the material and for the supervision of their understanding. The teacher-educators harnessed the technological tools in order to make a formative assessment during the semester. Using this means the learners could test themselves during their studies to discover whether they really understood, internalised and now commanded the new learning subjects well.

The teacher-educators enabled the learners to take a home exam with answers that they published afterwards. Thus they enabled the students to test themselves continually and to locate difficulties and lack of understanding and not to wait until the concluding examination at the end of the course in which they would reveal their learning status for the first time. In this manner they also helped the learner to organise the material and to learn it in small units and not only as learning to prepare for an examination.

There are tasks ... that constitute self-tests which they answer and then they press a button and obtain the correct (Milly).

To summarise: the organisation and management of their teaching was well planned ahead of time. It was structured, consistent and focussed on a demand from the students to comply with the timetable and to complete the tasks on time. Using a large variety of data representations they enabled the students to check themselves during their studies and to receive formative assessments of their understandings of the learning material during the process and a summative assessment at the end of the process.

4.3.1.3 Few Channels of Interaction

The third dimension that characterised the teacher-educators who used this mode was a paucity of interaction channels.

Shandy taught hundreds of people and could not form a personal interaction with each learner. In very exceptional cases she had a connection of some sort with a single student. Most of her interactions were those of a single teacher facing a group of hundreds of people. She felt that her function had been transformed from that of a teacher who taught to a teacher who supported while the students determined the type and depth of the support.

In contrast Milly taught a small group of people, and she perceived her function and responsibility as helping the students to acquire professional knowledge and not to develop interaction channels. Thus it emerged that both teacher-educators who used this mode initiated and used very few types and amounts of interactions.

I don't teach, I support them, help them, explain to them but only according to their demand (Shandy).

Things changed over the years for Shandy and she found a partial solution to the problem. She used a discussion group as a notice board.

The 'Talkative' Teacher in the Forum

Shandy and Milly used group discussions as a tool to channel communication between themselves and the students. They entered the forum very frequently and 'talked'. Their activity in the forum was expressed in the following way: they opened a new discussion group which they used to raise frequently heard questions, providing their own answers. In this manner they saved the students' time in asking these questions and they were able to receive the response and answer when they did not understand the subject.

I also put written answers in one discussion group if I see that questions are repeated several times because they haven't read it [properly]. I transfer it to the discussion group as an action team. And I refer them to there (Shandy).

This was used to save the teacher's time by providing a collective response instead of an individual response for each student, pooling together a number of questions into one broad and comprehensive answer on the subject and thus saving the students' time. They did not need to read several responses by the teacher in the forum, but alternatively one answer for a number of questions on similar or close subjects.

Shandy who taught hundreds of students understood that the implementation of a teaching process that would guide the students' participatory learning was not applicable because of the amount of learners and therefore did not even make any attempts to promote this form of teaching.

She channelled her role into follow-up of their studies. The frequency of her presence in the forum, the ways in which she reacted and the way in which she considered certain subjects stemmed from the students' desires, abilities and

requests. They were the ones who dictated the pace and her types of reactions.

*My role is to help them to learn, to answer them. **I no longer teach**, I am no longer what I used to be ... I mean if they turn to me in the group discussion there I explain or help them and if they don't refer to me, then not. That's my role, I follow-up on their learning (Shandy).*

To summarise, in this mode that was applied by teacher-educators for natural sciences and statistics, everything was predetermined and pre-planned and the students therefore had an obligation to prepare the tasks on time. The teacher-educators very frequently entered the forum but this mode did not lead to peer learning which was prevented by the course contents and the teaching mode.

Restricted Personal Interaction with the Individual Student

Due to the character of the course and the way in which it was taught, Milly did not create any personal interaction with the learners.

Shandy, who taught a multiple participant course, could not conduct personal interaction with the students. In the transition to distance teaching she lost her personal contact with the student. The new teaching method created the possibility of teaching a very, very large group of learners, but as a consequence of this process and the character of her course she had to change her teaching mode, that in the past had included being personally acquainted with the students. In traditional teaching the personal relationship was an important and strong component that radiated on the strength and power that she had as a teacher in the classroom and influenced the personal relations that were created between her and the students. In her estimation, what remained in the memory of her on-line students were the course and the materials but not the teacher, her face, her image and her name. Thus, in contrast to previous years, when she walked through the college corridors neither she nor the students recognised each other. She noted that sometimes within other settings or events of different sorts, people turned to her because

they recognised her name and told her that they were her students and had studied under her but she did not know them.

*It's as though in our perception we were God, we stood facing the class and with our charisma we delivered the material to them. What we taught them and what we said to them was what they knew. In this approach **where you're actually not there** ... even within the site and even if you write the entire site and its written there 'Shandy' that's rubbish, who remembers that. Its not there, it's a site and they don't know who is behind it. **It's a big relinquishment of your ego. You need to change your perception regarding teaching and you have to give up a lot of your control.** That maximal control that you feel when you stand face to face, you have no control, you don't know ... it's very difficult.... Those peaks that you need to leap over and to climb are mountains of different sorts both for your teaching perception and for your own self-perception. How should you deliver things? How should you present them? (Shandy).*

Shandy indicated that the only students that she had personal communication with were the students defined as 'exceptional', who needed a personal individual response from her. As part of her personal responsibility she tried to find the solution that would enable each student, who was required to study this course to comply with the tasks. She therefore treated these cases individually with person-to-person interaction. In a few other cases a personal dialogue was created and she usually channelled this for follow-up of students who had not presented their tasks on time. She used e-mail to take care of this and created written communication with the student. Using virtual tools that she had available she identified and supervised 'exceptional cases', lateness or non-performance of tasks. Thus, she found the students with special needs and entered into a personal dialogue in order to reach a solution for the problem.

If I see that there is someone who hasn't answered a task, I try to remind her that she needs to ... there isn't any avoidance, a student can't slip away, and there is complete support and response for everything. The student only needs to want it. I also had blind students within the site and they passed the course successfully (Shandy).

To summarise: the teacher-educators understand and perceive that it is important to form a personal interaction with each learner but at the level of implementation and of the students' feelings they do not succeed in creating a personal interaction with every learner.

Interaction only relates to Academic Issues

Shandy and Milly shared the opinion that their responsibility should focus on the academic area. So they did not act to promote social matters and non-academic activities, among the students and between themselves and the students. The rationale for this stemmed from the pedagogic educational perception that they used to teach adult students in an academic setting, so that their function and extent of involvement in social matters needed to be different and distinct from that of teachers who taught children in primary school or adolescents in secondary school.

I don't think that I have a role in their social activities. Let them make their social connections by themselves ... they are students; they're not pupils in secondary school nor in primary school (Milly).

Academic and Technological Aspects discussed in Face-to-face Sessions

In each semester it is customary to hold two face-to-face sessions; one at the beginning of the course and the second at its end. The amount of learners in the course and the character of the course dictated different styles for the face-to-face meetings. Milly's course required the performance of experiments in a laboratory; while Shandy's course only required exercises and understanding of the material without the need to perform laboratory experiments. These two factors influenced the character and contents of the face-to-face sessions and whether or not it was important to hold them.

Milly invited the students to a first face-to-face laboratory session in order to attempt to conduct experiments in the laboratory. She exploited their presence in the college so that they could experiment, learn and acquire experience in science laboratory work, which could not be acquired virtually or at a distance.

The student was required to have personal experience in work with materials, tools, methods and laboratory worker assistance. Using this format of sessions, she also continued to progress with the content in face-to-face sessions during the semester, usually providing two working laboratory sessions during the course.

I present the course, the subject of the course, the course site, all the requirements from the students and also we do the initial work ... that is a general laboratory and I put all this in the first lesson ... additional sessions are actually the laboratories that they have to come and do in the college (Milly).

In contrast, Shandy who taught a multiple participant course, did not see the need for the first session. In her estimation, the large amount of preparatory work that she invested in planning and constructing the course, in the site and the variety of data representations provided a suitable response and there was no special need to invite the students to a face-to-face session during the semester. But as part of the preparation and the extensive planning work that she invested before the opening of the academic year, she invited the students for a session already during the summer vacation, in which she provided short explanations regarding the organisation and operation of the course, the site and technology. She did this in order to leave the whole semester free for learning the field of knowledge. Even this session was not compulsory. She left the choice in the hands of the learner, as part of her approach that the responsibility for the learning is that of the learner and the learner is the one who decides whether to attend the session or not. The sessions took place on different dates, in small groups in order to provide a response, time and space for each learner.

All the learning is within the site - there is no need for a face-to-face lesson (Shandy).

The last meeting which was compulsory with Milly and elective with Shandy was devoted by them to additional preparation for the written examination that took place at the end of the course. The session focused on revision of the learnt subjects and the asking questions regarding the learnt material. The

teacher-educators saw themselves as responsible to prepare the student to succeed in the exam, so in the last face-to-face session of the semester, they helped the student by revising, summarising the material and providing sample questions from the exam.

The last lesson is revision and preparation for the exam. It is a discussion on the course (Milly).

Shandy had accumulated several years of experience during which the students had chosen not to come to this session. She thought about this a lot and found the solution by introducing sophisticated technology. Towards the end of the research year, she decided to use 'Interwise' software to coordinate a synchronised session with the learners. Using this programme she wanted to bridge the gap caused by the students' absence from the last session and to provide support and preparation for the final exam, but here too she was careful to maintain the rules of order using advance registration.

I put myself out and come in the afternoon ... not a lot of them come. Yesterday I had a session where out of 320 students [only] 6 came. They complain: 'It's terrible why aren't there any face-to-face lessons' but when you give them to them, they don't come. 30 came to the lesson at the end of semester A. I hope that this September because Interwise has been introduced, we shall succeed in organising a summarising synchronised lesson ... that they will have to register for in advance (Shandy).

To summarise: in the face-to-face sessions the teacher-educators provide support for the students' learning, which cannot be provided through distance-teaching or technology-assisted support. In the sciences course the face-to-face meetings were assigned for the learning of skills and practice in laboratory work while in the statistics course that included many participants the face-to-face meetings provided the organisational and technological framework for the course.

4.3.1.4 *Technologically-Oriented*

The teacher-educators' intensive use of technology in order to produce a wide variety of data representations and the integration of technology in the organisation of the learning made them more technologically oriented but only with a focus on the teaching field.

Shandy and Milly thought it was important that the teacher-educators should be familiar with the technology. They, themselves, were able to learn to use various options in updated software as necessary and to incorporate them within the site in order to promote and support teaching and learning. Their knowledge and familiarity with the virtual tools enabled them to increase the number and types of data representations offered on the learning site. In addition they thought that it was the role of the lecturer to know the platforms on which the course site was founded in order to make it more useful, and to enable it to contribute and be more effective for the teacher and for the student.

That means you obtain a platform with very many options and you need to learn to use these options (Shandy).

Since their technological orientation was only channelled into the learning field, both of them believed that it was not their job to upload materials onto the site. They thought it necessary to separate the roles of the teacher who deals with pedagogy from the role of the technical staff; expecting that the technical staff would show them options, but the choice remained in their hands. Since they put much emphasis on their work with a variety of data representations (during the summer vacation) they introduced alterations and supplements from the field and needed the help of the technical support staff.

I don't think that I need to do everything alone. I have my role and they (the technical staff) have theirs ... before each semester I do my part, send it to them (the technical support staff), I don't know how many pages of corrections, alterations, updates, new sites with new tasks ... I, if I want to introduce some sort of new update ... a video-clip to the site, or a self test that they study ... I turn to the computer unit ... I tell them what I

want, they offer me what they have and together we determine what will be (Milly)

Since their technological orientation was expressed only in the learning field, they did not themselves provide support for technological difficulties or problems that the students encountered.

I tell them that they can always come here to the technicians and ask them if necessary (Milly).

To summarise: They could control the taps of technology and searched for new technologies but they did not see themselves as professionals in the technological field, so they did not construct their sites by themselves or provide technological assistance for the students.

4.3.1.5 Summary of the Representation Mode

In this Representation mode used for distance-teaching of scientific disciplines, a number of common characteristics emerged:

Multiplicity of data representations providing a choice for the learner to choose what is appropriate for him and a large number of revisions and exercises that provided a response, solution and adaptation for different learning styles, use of a variety of data representations to create interest, diversity and lack of boredom for the learner. The learner was able to do exercises and to learn through a large number of methods without wearing out the teacher or being perceived by colleagues as a slow learner. When the teacher used this mode of work and learning environment it enabled the learner to plan personal time. It allowed the learners to choose their personal pace that suited their learning but required the teacher's daily entrance into the virtual environment of the course, a matter that demanded much of their time.

Expansive use of a variety of data representations enabled the learners to be independent and to understand the new material without the teacher's intervention. The technological and managerial tools found on the site, saved the teacher's precious time in examining the student's knowledge and in assessing task performance. A one-time investment was required to prepare

the course and then only slight corrections were necessary. This required extensive planning and thinking about each detail during the planning and construction of the course and the site and this was all done before the opening of the academic year.

The teacher-educator needed to continually learn and renew knowledge and get to know more and more tools in order to enrich the range of representations and this required much of the teacher-educator's time. Often the solution was found in increased dependence on the technical support staff. The teacher-educators find it difficult to be independent in the technological field as they need to work with many tools.

Scientific discipline courses are based on the acquisition of a large amount of knowledge. This quality actually dictates the characteristics described above, so that it does not matter whether there are a few students or hundreds who participate in the course, the teaching-learning principle remains the same.

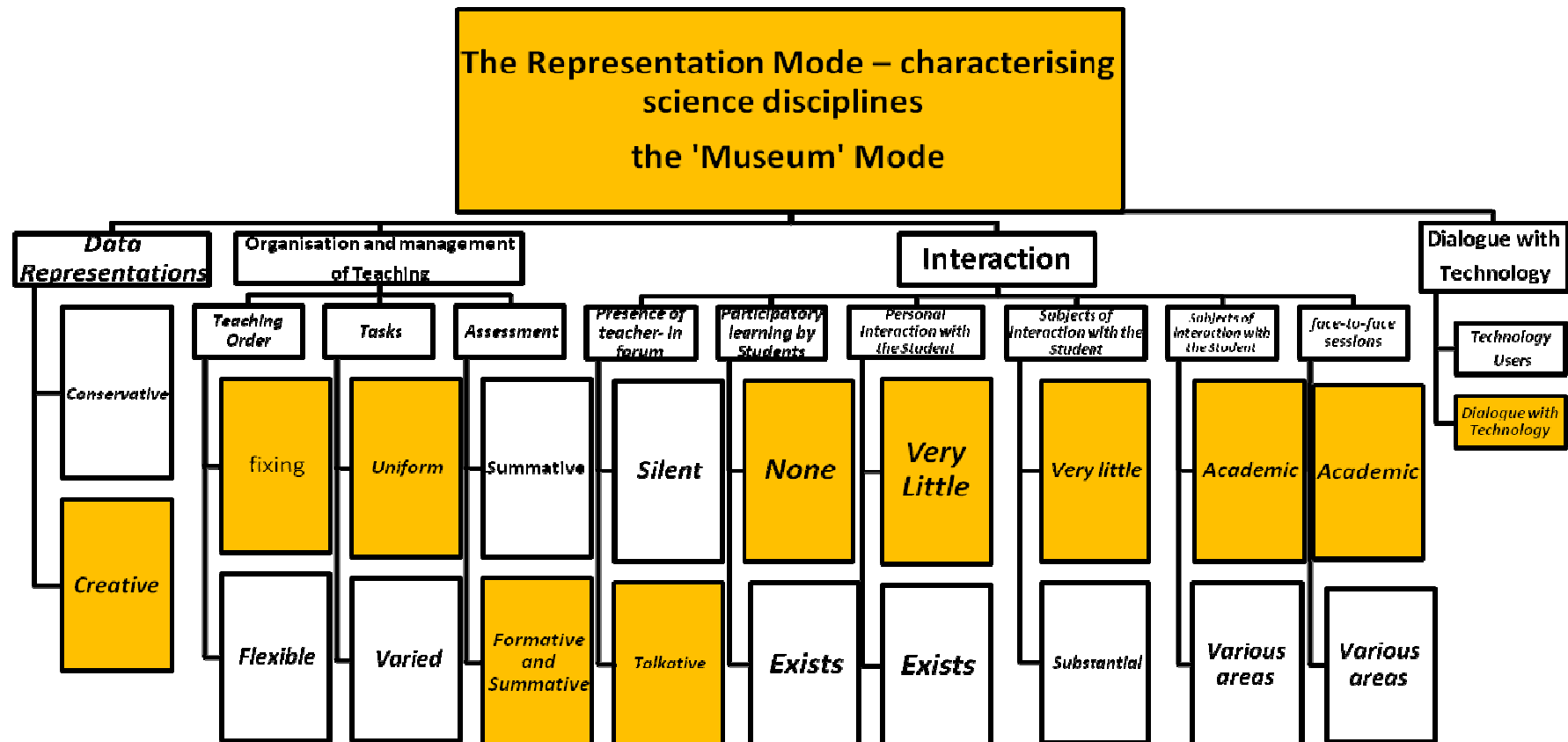


Figure 2: The Representative Mode

4.3.2 The Interactive Mode - characterising Teacher-educators teaching Literacy in different Languages: The Mary Poppins Mode

During analysis of the findings, a mode was found, which harnessed technology to strengthen the personal relationship regarding the learning with each individual student. This mode was named the 'interactive mode'.

Three teacher-educators teaching literacy and writing were found to belong to this mode. They taught various aspects of academic writing in the Hebrew and English languages, the latter as a foreign language. The number of students in each course was twenty to forty. The teacher-educators harnessed technology so that many students could use their word processors to write many drafts which were corrected and edited by the teacher-educators. Thanks to the use of technology a long and almost daily in-depth personal dialogue between the teacher and the learner was possible, enabling the student to try a large number of attempts until the student reached a high level of writing in comparison with his initial level when the process began.

I see the process. I see the first draft, the second draft (Tad).

*I felt that **Mary Poppins** had actually come down from the clouds. The film begins when she is in the clouds, she is in her aspirations, in Utopia, in what she thinks is good, meaning, not her but a place that has to be reached. **And everything that happens in her nanny process is actually what I want to happen in the teaching process...** She begins to work together with them, and together they tac-tac-tac-tac everything becomes organised, she makes everything so beautiful and so easy and that's actually, perhaps, what I think should happen, it is actually the intervention that she provides that makes everything happen (Palma).*

4.3.2.1 Conservative Data Representation

In this mode the teacher-educators used only two traditional data representations, reading and writing. This was their academic specialisation and they wished to impart high-level skills in these subjects to their students.

Teaching methods such as speaking and listening which were very central in traditional teaching were not expressed here.

The fact is that it is based on a single form of representation, while a [traditional] lesson is based on discussion, listening, speaking, on other things (Palma).

The lack of data representations and reliance only on writing added to their workload since they were required to read and write large amounts of text.

All the time I have to read and write, read and write, read and write, read and write. It also turns it into something that perhaps shifts the emphasis, from the other manners of presenting writing (Palma).

4.3.2.2 Organisation and Management of Open and Flexible Teaching

The teacher-educators saw the preliminary stage of thinking and planning as an important component that was fundamental to the entire teaching process. They formulated their goals in advance and defined the final objective which they wanted the students to reach. They invested much time in preparatory work mainly during the summer vacation before the academic year began. However this investment did not relieve their intensive activity during the course. During the semester they were busy with the work of supervision, organisation and management of the learning. They acted immediately to find and correct any deviations that were revealed.

I lead the whole business, which I direct in its entirety, and I know what I want to achieve in every area (Tad).

Their approach provided personal supervision for each learner while sharing the process with peers, so the course teacher determined a uniform but flexible order of teaching and learning for the entire group. The maintenance of a permanent order meant that all the learners were at the same stage in the sequence of tasks and ability to advance, however using their personal diary they were able to learn and receive personal, flexible guidance. This teaching mode provided support to encourage peer learning. In order to focus they needed to read, to learn and sometimes to receive materials both from the

teacher-educator and from other students, such as authentic materials brought from the field, or writing that they had composed concerning the materials received from the teacher.

There is a strict order and structure for the teaching and learning processes. They did not skip any stage. The students practised innumerable times until they achieved a fluently written final product. The teacher-educators guided them, and determined the pace and the contents. In this way they aspired to bring the student to a higher level of qualification, continually checking whether the student really learnt. Consequently, heavy responsibility was imposed on the teacher-educator.

*In principle, when planning the learning programme you have to plan it beforehand ...its just important **not to build it linearly but rather with many options** ... you have to be alert all the time, whether the student is really learning ... I have a sort of very tight network in my head, with all sorts of small buttons ... I think that if I could duplicate that network, like that with the buttons so they still retained their meaning, I could be a good distance teacher (Avon).*

The definition of the work method and the timetable for the students was determined beforehand. There was an obvious concern for the students' working and learning practices. They perceived this as part of the organisation of the learning environment, the acquisition of learning skills and the development of an independent learner. This meant that the responsibility for the learning and compliance with the timetable was part of the learner's duties and commitment. Therefore the teacher-educators carefully drafted and clarified the requirements and made sure that the tasks were performed on time.

*There must be very clear requirements, how often they entered the forum, when they entered the forum, on which day they entered the forum, the group and sub-groups in the course **and you have to be very, very, very clear** (Avon).*

Their approach necessitated an obvious investment of time and thought, giving attention to the form of the digital learning space. They thought that the design and manner in which the learning materials were presented and the ease of navigation in the site facilitated comprehension of the learning materials.

It's very, very important to me how the site looks. It's the site's work tool (Tad).

To summarise: the teacher-educators that used this mode devoted much time and thought to planning and organisation of the learning materials and adhered to their maintenance. At the same time they provided supervision and support for the students and staged their progress in a deep and intensive manner according to a timetable without any shortcuts. This teaching mode led to an open and flexible organisation of teaching that allowed the learner a large, open learning space.

Repetitive Presentation of Uniform Tasks

As noted the teacher-educators used texts and tasks, which they chose and uploaded onto the site even before the beginning of the academic year, so there was not very much leeway to make alterations in these materials during the course. The fact that the teacher-educators thought that peer learning was important also dictated the order of tasks and the distribution of dates for their performance over the semester. This work mode provided personal consideration and individual supervision for each student and was also of course expressed in the way that tasks were examined by the teacher-educators. The tasks were read and examined, the student received corrective feedback and this was repeated again and again. In-depth acquaintance with each learner enabled the teacher to assess whether the student had written the materials by himself or was helped by someone else and breached the rules of ethics.

Formative and Summative Assessment

Teacher-educators who used this mode saw the use of formative assessment as a central tool and felt that it provided support for each student to progress. They therefore enlisted the technological tools of e-mail and the forum in order to conduct formative assessment several times for each written document written by the student.

4.3.2.3 Multiple Channels of Interaction

The teacher-educators who adopted this mode saw interaction as the central component of their teaching mode. They made much use of the virtual space of the computerised forum and of e-mail as means to advance this agenda.

They thought it valuable that each learner should be open and able to read, study and learn from the contents, form of writing and corrections performed by their peers. Through this exposure before peers students were enabled to reach higher levels of understanding and application. Exposure to the remarks of their peers and of the teacher-educators helped the learners to improve and reach a higher level of writing.

*If you need to do something for your friend then your friend also learns at the same time ... here if someone disappears he is absent [from the group], I send him a reminder or I meet with him ... I think that **this should be open for everyone because they all in fact learn from everyone** ... in the first lesson ... I already tell them: look, this is my teaching method, we all see everyone, **whoever shows and has more mistakes will also actually receive the highest grade because he is the one who will undergo the most significant and longest process.** (Palma).*

The 'talkative' teacher on the forum

Teacher-educators who adopted this mode used the forum as a central tool for their communication with the students and as a means for teaching and learning. The forum served as a virtual platform to create interaction with the individual learner or group of learners and as a lever for peer learning. They were very anxious that as a result of the change in their teaching method they were liable to lose the most dominant characteristic of their teaching: 'the charismatic teacher'. They therefore found the solution for this distress by attending the forum every day. They felt that they had an obligation to regularly attend the group discussion, using it as a resource and means to maintain their status as teacher-educators.

*This means that the course is very intensive from the point of view of work, because it **demand my presence all the time** ... the frequency of my entrances and my considerations, not only the work per se. Also the process is in my view one of the solutions that I try to use to solve the problem of the disappearance of the charismatic teacher (Tad).*

Since they were perpetually anxious about their status and the change of their position in the teaching process, they used the forum as a mirror for their chosen method of teaching. Through this mirror they were able to reconstruct the interaction and teaching that they had with their learners in the traditional system, to reflect on their own work, to examine themselves, to ponder and think and to learn something from this.

I need to examine myself as a teacher all the time and this teaches me quite a lot about myself as a teacher with regard to my way of reaction, the method by which people go from point A to point B within the forum. In fact, the main part of the activity is in the forum. How I see myself as a teacher (Tad).

They harnessed the forum as a means to examine and to display the presence of the students in the learning process over time. Thus they enforced, ensured and followed-up on the students making sure that they persevered with regular

presence throughout the course and did not only peep in from time to time on detached visits over the course.

Your presence is actually your participation in the forum (Palma).

I see them over tens of tasks (Tad).

They brought the learners to a higher level of learning, supplying a flow of 'oxygen' to the group dialogue, and linking them to external data resources. They perceived the continuation of discussion in the forum as a central part of the learning experience. They therefore continually ensured that the discussion did not die away. When they sensed that there was difficulty or a drop in the discussion they intervened and tried to use their pedagogic skills, command of the area of knowledge and enrichment from sources of data to direct, renew and widen the discussion. They perceived it as their role to be the central figure in the forum, leading and steering the discussion. They performed managerial work in the forum thereby organising materials and files and presented the contents in a clearly explained manner for all the learners.

Our interactions, those between the students themselves are very important to me. But I know, I am aware and I argue that if they don't have any interaction with external data sources, so then it will be a means to aggrandise ignorance. The fact that they read and learn and learn by heart, also won't transform it into something they acquire. They need to talk about it (Avon).

The forum served as a place to upload students' products. The work and writing of each student was examined and again uploaded onto the forum at each stage. The first stage was the initial writing of the student. The second stage was the feed-back, comments and remarks by the teacher concerning the student's work. Stage three was the students' correction and improvement of the text and this process was repeated as a consistent ritual. In this way communication was formed between the teacher-educator and the individual student while the whole community of learners could watch, be partners in the process and learn from it.

I think that their writing ability, the ability to express themselves, freely has been improved ... the whole issue relates to the student's writing, from the aspect of the spelling and language ... their ability to understand that learning is a process (Avon).

Tightening Personal Interaction with the Individual

An additional channel of interaction that emerged from the findings is the relationship that is woven between the course teacher and the individual student.

For the teacher-educators who taught according to this mode, interaction with the individual learner was the most significant and important aspect in the teaching and in the teacher-student dialogue. They were concerned with regard to the effect of the transition from traditional teaching to distance-learning and the profit and loss it produced with regard to their interaction with the students. They felt threatened that their place was pushed aside by distance-learning so they harnessed technological tools to enable very frequent direct personal communication with the students. The cost was the large amount of time that they devoted to the course and teaching.

As noted, the new learning environment enabled them to create a direct personal relationship with each learner. The teacher-educator was able to isolate each 'disturbance' and to focus exclusively on the goal. In comparison to traditional teaching where the teacher was required at the same time to look after, treat and organise a large number of learning subjects, here in the new environment the teacher's role could be devoted solely to teaching and to an individual dialogue with each learner.

*The deliberation of each teacher who transfers from the system, of the **charismatic teacher** is whether this move which is a transfer to modern means does not mean a loss of the personal relationship with the pupils, the look in their eyes, the support, the class atmosphere, very many things? (Tad).*

The teacher-educators sensed the difficulty involved in the lack of their ability to make a personal relationship with each individual student. This bothered them a lot. The solution that they have found, assisted by technology, was to use e-mail and discussion groups. Their teaching presence was made through these tools to the students and their daily communication contributed to strengthening and deepening the connection, and developing personal tutoring, support and personal follow-up for each of the learners. They felt that they granted each student an 'attentive ear' and professional pedagogic supervision as needed.

*I was concerned that this disappearance would be bad for education and it is bad for personal contact because any personal contact in an on-line method, even the most sophisticated, loses something, something is lost and **that something can't be made up** ... so that going into this adventure, for me has opened up a lot. Because I find that without stigmas it is not only learning that is on line / computerised / technical / listening learning **but it is learning that also enables a direct contact and also depth and also provides respect to the student, but in different ways** (Tad).*

They felt that they reached a very high degree of closeness and familiarity with each learner to the extent that they knew the student's typed 'handwriting' on the computer. They knew how to identify each student's personal writing style. Their professional expertise was originally in the field of literacy and writing and so their familiarity with the person who was the student was through their writing.

I know them through their writing, also from their personal approaches through the e-mail or in the forum, also in the task writing itself I can already identify personal writing styles, oh I can learn a lot from someone's writing, beyond his level in the course (Palma).

They saw their role as qualification trainers and so they felt a need for personal, frequent and consistent fostering. This frequency of transmission of materials created a very strong personal relationship between the student and the teacher-educator.

They used technological options such as: a forum, and 'track changes' in the word-processor in order to advance this dialogue. When the format of the forum was observed, this subject was very obvious, there the lecturer appeared in a different colour and 'peeped out' of every page of the forum. Every message sent by a student was immediately followed by the mentor's reaction. In an overview of the site they appeared to be intertwined one with the other. A personal relationship was reflected between the student and the teacher. This connection also compensated for the teacher being a 'lone wolf' facing the computer display, who does not meet anyone.

*With the help of the forum and the e-mail and the reading by their peers and change tracking and the introduction of remarks etc. **Since I'm continually fighting in this job not to lose the other dimension**, the dimension of the student, so that the student won't become enslaved by the computer. And so that the computer will in the end just be a work tool and not the principal tool that controls our lives. **I put the emphasis on reading by their peers, on inter-personal contact, also between the teacher and the student** ... I respond to every one of their entries ... today we ... stand at 700 entries. **I have made a rule for myself that I answer the remarks of each pupil to another pupil for peer reading of a text** that he has made. I mean there are simply hundreds of entries there ... Because in our forum every one of my entries is coloured red, although I did not plan it that way and **so they see that the entries of the students are embraced by my reds**. Each one on his two sides, has red and that's actually very attractive text, with their entries and with my entries for each one. Even when they just comment (Tad).*

The teacher-educators used e-mail as a means to strengthen their connection with the individual student through the provision of a quick reply for each student request. The teacher-educators, who worked in a computerised environment, spent long hours beside the computer and when a letter arrived by e-mail they heard a ring from the computer and immediately sought for the letter that had arrived. Thus, almost in real time, when the student sent a

request, the teacher could receive it and immediately provide a solution, help or response.

E-mail served in some cases as a pedagogic tool enabling the learner to write a personal journal. This journal, in contrast to writing on the forum that is open to everyone, remained confidential and only the teacher and the student could see it, read it and write in it. This dialogue contributed much to the strengthening of the relations between them. This tool also provided an opportunity to record the entire learning process. At every stage it was possible to go back, to reread and to see the professional development of the learner. Using this relationship that was created by e-mail correspondence it was possible to learn and go deeper into a particular subject. The dialogue by e-mail often served to make a formative assessment or a summative assessment of the learning process or in order to treat a particular subject. At the end of the semester all the material remained in the student's possession to enable reflection to be conducted by the student on the work. Thanks to the e-mail correspondence the teacher-educators distinguished all the minute nuances and the technological tools enabled them to provide an 'attentive ear' and to show much sensitivity towards the student. Despite the uniformity of printed language they had the ability to distinguish certain tones of writing and student's emotional expressions such as happiness and anger.

They feel that because there is e-mail so: 'the teacher is accessible for me and if I am in difficulties then he should now solve the problem for me, I won't wait until another week until he comes into the forum in another few days, but now I want to get an answer'. So the e-mail really happens every day (Palma).

Over the entire period of their work they manage a writing journal, this journal is not uploaded into the forum but they send it by e-mail. It is between them and me (Tad).

*In your e-mail **I heard the anger** (Avon).*

They also used e-mail in order to maintain the individual's confidentiality when transmitting unpleasant messages to students such as: criticism, notification of non-performance of a task. In other words subjects, which, if they were uploaded onto the forum might hurt the student and disparage him in public, or alternatively personal subjects that the individual student did not wish to share with his peers but only with the teacher-educator.

Other reactions are given by e-mail ... it is not done on the forum in order not to embarrass them, but it is done by private e-mail ... but its emphasised that every personal problem and any problem that the student does not wish to upload onto the forum because the forum is read by everyone and opened by everyone, is transferred to e-mail (Tad).

However, despite all these very intensive efforts and work they still had the feeling that distance-teaching did not fulfil all the teaching characteristics because it lacked something, which could not be filled. They thought that there should be strong personal relations between the teacher and the pupil, continually built and maintained by eye contact. In this work environment they could not use this technique and so despite all the technological solutions they felt that they had not succeeded in bridging the gap sufficiently.

When I teach someone to be a teacher, he can't be a teacher until he catches the bit about frontal teaching, of eye contact. The writing process is a process between a person and a text. And in teaching writing it is a process between a person and a text and with the person who teaches. And this is very difficult to provide, a request that it is very difficult to provide in teaching. So we have found good solutions, possible ones, but they are still not sufficient (Tad).

To summarise: They saw the creation of a personal relationship with each student relating to learning as an additional central element of their teaching mode, and they used technological tools such as e-mail and the forum to facilitate frequent direct, personal communication with the students. The use of these technological tools served as a response to the shortfall created by the lack of face-to-face meeting. They devoted much time to these communications in order to develop a personal dialogue with each learner.

Interaction relating only to Academic Subjects

The teacher-educators who used this mode did not see it as their role to promote social relations between students or inter-personal relations. They explained this to the students through their written language and the academic orientation that they gave to their writings on the forum. They were proud of their declaration on this subject and thought that this was the proper way to teach and saw it as an educational rationale. Their perception stemmed from a fear that transgression into social subjects might disrupt the hierarchy between the teacher and the college and the student and would harm their status as teacher-educators. The blurring of boundaries might also influence the character and type of discussions in forums so that they might reach undesirable areas and subjects that would not contribute to learning.

I don't use it as a coffee bar, definitely not, there is nothing personal there; everything is work, remarks, texts, questions that they write to one another on study subjects (Palma).

Face-to-face sessions relating to the academic aspect

As noted, all the face-to-face sessions dealt with dialogue concerning purely academic subjects and were devoted to improving the learning abilities of the individual student and the learners' group.

The research findings show that the three teacher-educators included in this mode ensured that there would be two face-to-face meetings in the first and last lessons of the semester and required compulsory attendance by the students. Sometimes they increased the number of personal sessions during the semester, according to students' personal or group requests.

The first session was devoted to training the students for the process they would undergo as they acquired writing skills through the technology. So the first lesson was mainly devoted to getting to know materials and the tools that would assist the students during the semester. In addition they devoted time in this session to a presentation of their teaching approach, emphasising the importance of peer learning and the creation of a strong interaction between

the learners. This interaction was an inseparable part of the learning process and all students were obliged to take part.

In the opening lesson I ... it's a presentation of the computerised tools. I present the structure of the lesson ... after the welcome, and after a short time during which I describe the site ... it's a presentation of the possible ways to enter; they practice entry into the site and how to react to the words of their peers (Tad).

Additional face-to-face sessions that they conducted with the students during the semester were not compulsory and their number, frequency and the amount of participants altered according to the students' needs. These meetings served to reinforce and support the learning process since they felt that teaching and learning could not just be carried out virtually. So they responded to students' requests to meet with them personally. In these sessions they tried to bridge the gap in a way that could not be done through technology. The meetings were usually individual meetings with a single student or with a restricted number of students. They were attentive to all the students' problems and difficulties and spread out many options and dates when they would be available to meet the student. The additional meetings were devoted solely to academic issues, mediating and explaining subjects to the student(s).

[Students call saying] "It is not clear to me" and they ask for a meeting ... I know that when they begin their path, when they begin to interact with academic texts and theoretical texts, students are often in a frustrating interaction. This means, they needed to mediate [the contents] either within the setting of a lesson or in a face-to-face meeting with the expert.

They held a last face-to-face meeting with the whole group at the end of the semester. In these disciplines there was no final exam, so there was no need to prepare for an exam. The session was devoted to completing the learning cycle and feedback concerning the learning process.

What I plan in the last lesson is actually feedback (Tad).

To summarise: as noted, all the face-to-face sessions dealt with dialogue concerning purely academic issues, devoted to improving the individual student's and the group's learning abilities. The focus of the face-to-face meetings - both the compulsory meetings and those initiated by the students or the teacher-educators – was directed to assisting students' progress in the learning processes.

4.3.2.4 Technology Users

The findings showed that the teacher-educators who adopted this mode recognised the powers and significant contribution of technology to the pedagogic process but they did not see themselves as technologically oriented, rather as experts in the field of teaching, so that technology was not perceived as part of their role. They thought that there should be a pedagogic aspect separate from technology so they also did not aspire to acquire new knowledge and skills in this field in order to improve their technological teaching. This was also the reason that they did not upload materials onto the site by themselves. They referred to the technical support staff to help them upload materials on the site. The result is that this dependence sometimes impeded their ability to make spontaneous alterations on the site.

*From a technological point of view, I don't have any role ... and there's no need for it ... I'm assisted by professionals and I don't solve them by myself. **I explicitly want to remain on the didactic side, the pedagogy of the contents and not the technical side** (Tad).*

As a consequence of this perception, a lack of time, and the clear separation of technology from pedagogical roles they did not think that it was part of their role to provide technical and technological assistance to students. This thinking and behaviour was the result of several factors:

1. A sense that the students have a better command of technology than they do.

Yes, yes students already know by themselves; they have already learnt by themselves on the first day they already understand that they have someone to turn to [the technical support staff]. They never turn to me (Avon).

2. Saving the teacher's time because of the unwillingness of the teacher-educators to devote time to this issue. *I transmit the feeling to the students that any technical obstacle shouldn't be referred to me, but to the computer people ... **I am not built for that, and I don't want to devote time to it** (Tad).*

To summarise, the findings showed a clear separation in this mode between the pedagogic aspects of teaching (which the teacher-educators saw as their function) and the technological aspects of the course connected with the course site and the provision of technical support to the students (in which the teacher-educators chose not to be involved).

4.3.2.5 Summary of the Interactive Mode

A number of characteristic advantages emerged from the findings that typified the work of teacher-educators who teach the discipline of literacy through this mode of distance-learning: thanks to the technology and their provision of intensive personal interaction, including assessment and feedback for each learner, they were able to provide a quick consecutive response throughout the week for each learner, so there was no need to wait as in traditional teaching for a week until the time of the next lesson. According to the teacher-educators, at the end of each course all learners did feel that they had learnt and progressed and knew that they had the materials and the records of the writing process that they had undergone. The learner acquired skills for team work, compliance with a timetable, receiving and contributing to colleagues and acquired learning and work practices in the field of peer teaching.

These work methods also led to a number of difficulties: all the teaching and learning work is composed of only two basic data representations – reading and writing. The intensified work process that each teacher invested in daily during the course may lead to burn-out and the work load did not lessen in later years. The only area in which the teacher-educators allowed themselves some relief was their involvement in technological matters both with regard to their own work in uploading materials onto the site and the non-provision of technical help to students concerning this issue.

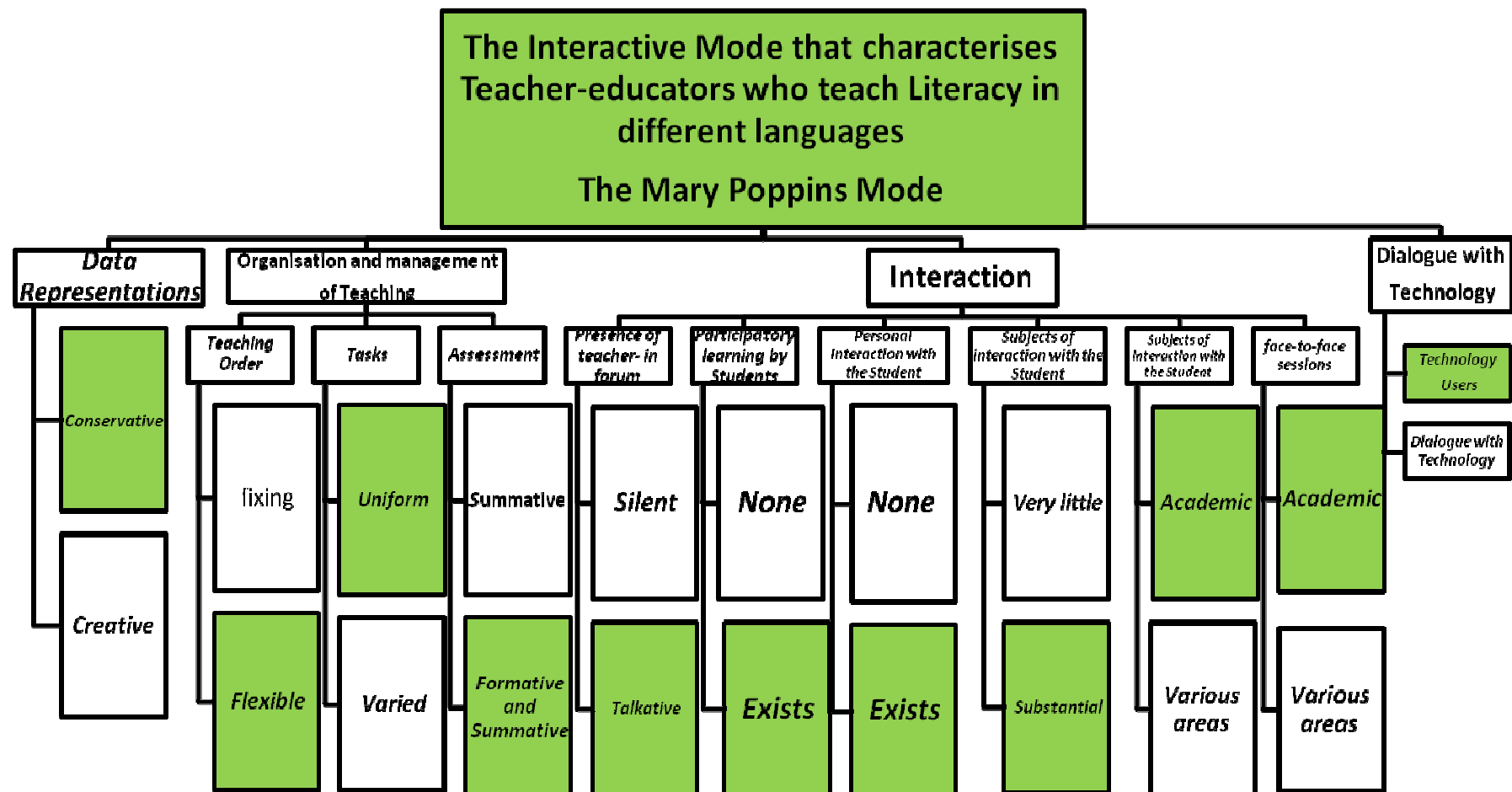


Figure 3: The Interactive Mode

4.3.3 The Organisational Mode – characterising Teacher-Educators teaching Education Disciplines: The 'Puppet Theatre Operator' Mode

In contrast to the two other modes that were described above, teacher-educators using this mode harnessed technology to organise and manage learning and teaching.

The teacher-educators who characterise this mode organise a strict order of learning materials, demand compliance with the timetable and welcome any technological tool that can assist them in the organisational work. Thus they achieve accessibility and an effective means for supervision and control unlike the means used in the traditional class. Due to the use of the computer and online technology, they 'save' the learners' time; their condition is that the instalment and operation will not require any time investment on their part and so they refrain from using technological tools that require a lot of work time. The six teacher-educators found to belong to this mode teach disciplines in the education field. They teach up to 30 students in a 'class'. In the past these courses were delivered through frontal lectures. The principal contents of the on-line courses deal with educational theories and teaching methods for different pupil populations:

A string puppet theatre. I am the one who pulls the strings from behind and the puppets are the students. In face-to-face teaching I actually talk about accompanying them and here I pull more (Zinnia).

To be like an octopus with all the need and ability to think and do tens of thousands of things simultaneously. Not to release them and to follow-up on them all the time (Elsie).

4.3.3.1 Conservative Data Representations

Teacher-educators within this mode, make minimal use of a number of data representations. They use two main representations: writing and reading. The students, on their part, sometimes choose to upload their products as representations, but the teacher-educators, in their assessments do not

consider or provide feedback regarding the manner in which the information is presented. Attempts were made by the teacher-educators to widen the variety of data representations, but they stopped the process when they encountered technological difficulty or because they feared that this would take up too much of the students' time, abandoning the integration and assimilation of the innovation.

*I wanted voices, 'situations from the field' ...I wanted a video excerpt but from a technical point of view ... I told the technicians that it was very complicated to upload it ... **actually it was dropped because of technical reasons** (Zinnia).*

They perceived the variety of data representations, as basic components in the creation of a virtual learning environment. Their concepts and intentions were interrupted when they understood from discussions with colleagues on the subject that a variety of data representations was not one of the basic components of the distance-learning and teaching course. Their reactions were not long in coming, and they immediately declared publicly (in one of the staff meetings of distance teacher-educators) that they would no longer include pictures and would return to working only with the two main representations: reading and writing.

Since this was the first time, I thought that each lesson needed pictures, and that I would be very hyperactive and dynamic so that they would see, not just understand the concepts but from things that emerged from the conversation I understood that this was not essential (Annis).

4.3.3.2 Organisation and Management of Consistent and Focused Teaching

From the analysis of the research findings it was seen that the occupation with the subject of organisation and its different aspects was the organising axis for this mode of work and the teacher-educators' perception of their function. Teacher-educators using this mode planned and organised the site including the preparation and construction of tasks before the course began. Only when a constraint or special need appeared, would the teacher-educators change or

correct their predetermined plan. In courses, built on products and observations from the field, a higher proportion of corrections were introduced, although the list of subjects was determined previously. However, the order in which the different theories were taught was sometimes altered in accordance with observations that the students provided and the problems that they encountered and which they recorded in their observations.

I build it beforehand and I added [some things] during the course but not a lot, just relating to what emerges but the foundation is created beforehand (Zinnia).

The subject of planning, organisation and logistics of the site and the way in which the learning and teaching was arranged within it were in the teacher-educators' view very important. They devoted time and thought to all the subjects and activities relating to site planning and construction of the virtual learning environment and the operation of the course. Their goal was to produce maximum effectiveness of the teaching and minimum disturbance for the teacher during the academic year. This teaching mode had a number of implications for the work method of both the teacher-educators and the students. They provided themselves and the students with a full picture of the course contents and its tasks. This enabled them and the students to organise correspondingly, meaning to plan the timetable and learn new subjects. The areas of their planning included: pedagogy, technology at the level of a user and organisation. They therefore felt that they encompassed all the planning aspects and did not leave a subject untreated. They were very careful to write clear instructions and orders in order to prevent later misunderstandings and lack of clarity. Since the materials were written and presented on site, this required their prior consideration of all possibilities. They believed that correct organisation of the materials, the tasks and the instructions following work sequences contributed to the students' improved understanding.

Preparation of the course is more detailed and far more demanding than in a regular course ...it demands a lot of thinking for these things ...its being a teacher, its being a supporter, being a manager ... it's impossible to simply produce it automatically ... and you can

change it later as a reaction to ... and not within the process ... and then again as a result of students' reactions. I can change to the left or to the right but I do it all from the beginning; during the summer or semester vacation (Merry).

They exploited the range of possibilities offered by the word-processor. The organisation of materials in the tasks was done through the use of templates and tables which could be edited and created with a word processor.

They often created combinations of materials and sources by themselves or in other cases they were helped by ready-made materials found on the web which could be downloaded free. Often they took processed materials from the sites of colleagues, copying the applications created there, using templates created by colleagues and just filling them with their own contents.

I prepared some sort of table divided into subjects with dates to present tasks and each date for task presentation, I broke it up into categories relevant to the specific task and so you see that in the end I have a lot of material on each one ... and accordingly I have begun to put my contents onto the site, but actually I went to Y's courses and X's courses and took the ... ready-made tables from there, and in this way I constructed the course, I divided the subjects into sub-units and did it all according to what existed on the site (Merry).

Their guideline was to maintain order, organisation and compliance with the timetable in order to facilitate the teacher-educators' work, believing that this was most beneficial for the students and caused them to organise their thinking. They therefore took special care to provide clear pre-determined instructions and tasks. They drafted clear requirements so that each learner could 'keep up' and so that everyone could act as expected. They managed meticulous records of student grades. They organised all the accumulated information regarding the students' achievements and tasks presented during the course. These records served them for supervision during the semester, to give a grade at the end of the course and as evidence if there were differences of opinion between the teacher and the student concerning the representation of tasks or a grade.

The teacher-educators who used this mode tended to penalise all those who did not comply with the rules. Since they saw it as part of their role to impart work practices to the students, they also felt antipathy and anger towards those who deviated from the path and were very disappointed when the students had difficulty assimilating work habits appropriate to their demands and they interpreted this as disrespect on the students' part.

*The course organisation provides exact dates so that whoever can't do it tells me. I complete it and sum it up and they know that the task is finished; I, from my part know that I have finished! They comply with the timetable. They like the fact that it gives them order in their heads and in their thinking... its ordered from the point of view of tasks, dates and objectives... its true that, **I at first put much pressure on them**, so that they shouldn't write there (at a different place on the forum from that which was determined) so that they should correct their work **and then I delete it... It annoys me a lot when students come in on the last day and upload their tasks! From my point of view that shows a severe lack of seriousness** (Eileen).*

They thought about order and organisation throughout the course. The moment that they sensed that the students had misunderstood, they interpreted the difficulty in terms of order and organisation. In this manner they maintained their control so that the students all studied the same subjects and materials according to the same order and they did not allow the students to choose to learn according to their needs. Nevertheless they continually had the sense that the students were required to learn a large amount of material and the solution they offered was to reduce the amount of materials and links.

To summarise: the organising axis of this mode of teaching was organisation and management of the learning environment and of the students. The teacher-educators saw their ability to organise and manage their teaching in a fixed and focussed manner as the central motive of their teaching mode. For this reason they only made a few slight alterations to the sites during the semester. They saw the learner as an autonomous entity and used technology to respond to or arrest disturbances and diversions by the students. These teacher-educators

harness technology to advance and support their organisation, supervision, order and use of ready-made formats.

Provision of Uniform Tasks

These teacher-educators chose to provide uniform tasks for all students; they viewed this as an additional means and possible way to save their time when preparing the work. According to this teaching procedure, the examinations and feedback that they needed to give to the students were aimed at leading the students to produce uniform products. This produced a dilemma for the teacher-educators who tried to decide what sort of feedback to provide since they chose not to relate to each one separately in order to save their own private time.

They write the works themselves, they write according to the criteria, all of them... That means that all the presentations of everybody were good. So should I write to each one saying: 'A nice representation?' That can't be right, can't be (Eileen).

Having to cope with this subject and thinking about time-saving led them to reduce the number of tasks given to the student during the course, significantly reducing the time they devoted to this subject, so that a new task was only given once every two weeks and not each week.

Next year I shall improve the course I shall give the tasks once every two weeks. I work on them all the time, throughout the course (Annis).

They justified the change that they made because of students' complaints about the heavy workload during the virtual course. They did not suffice with the arguments that the students made, and compared the amount of tasks given in the past, in traditional teaching with the number of tasks and time that each student devoted to them in the virtual course which was found to be far higher. They saw this as a welcome change and believed it enabled them to reach additional pedagogic and logistic objectives: the students devoted longer time and thinking to each task, and had a longer period of time to understand the learnt material, to perform the task, to clarify things, and to question.

They had a sense of satisfaction regarding this subject because the feedback supported the process.

The problem for me is also not to create too great a work load for them, it's really too many tasks in a short time (Merry).

I did some self-feedback for the course; the tasks are once every two weeks. ... They said that this was successful, two weeks, because it gives them a lot of time to get organised (Eileen).

Since they worked in a methodical and organised manner they were able to supervise each of the learners and to know what their status was with regard to the presentation of tasks.

I prepared ... a table that I record ... that is divided according to the presentation dates for the tasks and I break down each presentation date for the tasks into several categories which are relevant to that task and then in the end I see that I have a lot of material for each one (Merry).

To summarise: the number of tasks, their frequency, uniformity and scope were the result of the teacher-educators' consideration for improved organisation and a desire to save time for themselves and sometimes for their students. However, in addition to these functions the order and organisation also enabled them to supervise each learner more efficiently.

Summative Assessment

When they thought about how to cope with the subject of assessment, they had to consider the dilemma of what the students did with the materials that they received and whether they read them. From their part, they felt that they had guided the students to independent learning; they provided them with the reading materials, to study and learn. But were the students really independent learners? Did the students use them? Did they really read them and what did they do with them? And how could all these processes be assessed? In addition they found it very difficult to assess the tasks with a numerical grade. Usually the tasks that they provided were answered in writing while the best

option would have been verbal assessment. It was therefore very difficult to provide a numerical grade for each discussion and each task.

I'm not sure that they read all that is written... Did she read it or not read it; nobody can know (Eileen).

The problem is how to categorise something that is qualitative into something quantitative. *If he answered three times does that give him a grade for the amount that he answered or should I relate to the quality of the message? So this relates to the quality of the message, it's terribly important to provide a grade for the quality of the message. [I need] to categorise it into something that is measurable (Elsie).*

To summarise: the type of tasks that they provided and their one-time examination meant that the teacher-educators only gave the students a summative assessment. The teacher-educators employing this mode were uncertain with regard to the students' learning process, unsure whether the students had really learnt something and how and on what to evaluate them? Evaluation based solely on texts led to doubts concerning the accuracy of a numerical score.

4.3.3.3 Few Channels of Interaction

Teacher-educators who adopted this mode believed that the absence of physical meetings and the non-immediate reaction time for the student, created a different type of interaction with the student. The traditional teaching mode was mainly with a group and not personal. They now conducted a different management of the class and this enabled them to create inter-personal connections with each student and group connections with the students.

I think that to teach at a distance there is this difficulty that we are not available for him at the same moment and don't answer his questions at the same time, we don't see his mimicry and his body language, which creates difficulties ... this matter of having a physical distance between the learner and the teacher creates many changes in the way in which you manage the class (Merry).

The 'Silent' and Invisible Teacher on the Forum

The presence of the teacher-educators on the forum is channelled to the subject of organisation and effective use of their own time and that of the students. The forum served as a means for follow-up, support and provision of a response to the needs and wishes of the students as a group and as individuals on the declarative level. Accordingly, they determine the amount and character of the reaction. In the forum, they perceived their role as being to advance three pedagogic subjects that are very important in their eyes: to foster independent learning, peer learning as in the Interactive mode and to deepen understanding of the studied subjects as in the Representation mode but they promoted these areas through organisation, improvement of effectiveness and consideration for the saving of time for themselves and for the students.

*I tried it in some of the cases, I would say to them beforehand, that I wouldn't react to all the messages..., from my experience **this would also get them used to not getting a reaction for everything** (Eileen).*

I arrived at the forum with clear objectives (Trudy).

Their main guideline regarding the frequency of their entry into the forum and the type of intervention they used in it was based on two main considerations, planning their private time and the amount of time that they wanted or were able to devote to the subject. Sometimes they preferred to enter during the discussion so that a lot of work did not accumulate at the weekend.

I can't wait for the end because it's difficult for me, from the point of view of my organisation, afterwards, there are courses which are terribly large, its difficult for me afterwards to react to everyone. I prefer each day or every two days, to enter, that's my task (Eileen).

An additional consideration when deciding whether and when to enter the forum is the type of task. They distinguished between tasks that summarise a subject and tasks that invite discussion. For the former, they only entered at the end of the discussion, whereas in the latter type they responded shortly during the discussion process, to animate the discussion but in a careful manner so

that their opinion would not influence the view of the students' discussion development, and for the former type (summarising a subject) they sometimes only entered to read and sometimes they reacted because they saw that this would assist the development of the students' learning:

In a task that is, let's say, a task to summarise a subject, I prefer to say something after they have finished. In a task where there is a discussion when I feel that part of the discussion constitutes the development of their learning – then I react during the discussion but in an amount that enables them to react to one another before I intervene. Because often as soon as you have reacted, then everyone catches on to the same principle. (Elsie).

In the meetings with the teacher-educators they also indicated their self-criticism regarding the frequency of their entry into the forum. They understood that the time gap between the date when the student uploaded the task and created contact of some sort through the forum and until the date when he received the reaction might cause tension and perhaps disappointment for the learner.

There is a real mismatch between the times, there is no immediacy, I think that it's a very serious problem ... because sometimes until I coordinate things a week may pass and they already want it here and now ... I feel that there is a slight loosening-up because I don't react immediately (Zinnia).

The strong need for good organisation of the forum, using it to make things easier for the learners led them to take special care regarding the form in which the message titles were written. They were very strict about this so that each message would have a different subject. The title needed to represent the essence of the message's content. This form of writing led to a huge saving of time since often the readers: the teacher or a student, were able to suffice by reading the title alone and not going into the depth of the message itself. Moreover, each student reacted to their peers and this student's message would appear in a string directly after the message, using the acquisition of these work habits for the forum and writing in an Internet string. No student

remained without feedback for his work so that even students who acted timidly and hesitantly were given legitimisation and a platform to say what they wanted to and to influence others.

The message content must be connected with the process, the comments need to be practical and purposeful for the recipient ... the message title must contain an opening sentence that describes the essence of the message's content (Trudy).

To summarise: the voice of the teacher-educators in the forum was minimal and directed to all the students as a group. This mode relied on two main components: the management of their private time and the choice of a particular type of tasks; technology helped them to conduct a 'headers' discourse and to organise the learners.

Restricted Personal Interaction with the Individual

In this mode the teacher-educators devoted little time to the individual student so that they also provided little support for him. Although they thought that personal interaction was something significant for the student, in actuality their personal interaction with the student was very restricted. They felt that some of the students' demands to receive a personal response and the satisfaction of the learner's personal needs did not advance the learning process, so they were content with their decision to avoid devoting time to this matter.

They always want to receive a response ... from my experience and the feedbacks arrive, the students like personal feedback and even expect it. This does not mean that the feedback advances the discussion. I feel that they want to receive the reaction 'it's O.K.' (Eileen).

The use of e-mail was reduced to cases where they felt obliged to maintain the student's confidentiality in front of the group. The subject of private confidentiality was an important value for them and despite their desire to make their work more effective there were subjects to which they devoted time and developed a personal dialogue with a particular learner in order to answer his

needs, requests and wishes concerning subjects which it was not suitable to share with everyone.

*I didn't want to **turn to her in the group discussion** because I didn't want to disgrace her in public so I wrote to her that she should write to me by mail ... things like those I couldn't do on the forum, I had to do it by e-mail (Merry).*

The minimisation of personal relations was expressed by the fact that they could not remember the names and identities of the learners. They perceived their inability to see the students as their inability to get to know them. In general, it disturbed them that they were unable to create a personal relationship with the learners and in particular the lack of depth of the connection that they created or did not create. They felt that they did not realise the personal connection which was consequently perceived as being more artificial and superficial than in traditional teaching.

In such a semester I can't remember the names of the students while in individual learning in my lesson, I knew everyone. To try to connect Rotem who wrote with Rotem that was in the class, it's very difficult ... it's not just a picture, you don't meet them. It's already another type of organisation ... it's a real pity that I don't see them and I don't know them (Eileen).

Even new teacher-educators who on entering distance teaching thought they would work in a personal way with each student by using a personal file, soon understood that this took a lot of time, and began to abandon personal interaction in order to gain a larger time space.

In the course where there is a personal file then its all the time one on one, he sends it to me, I answer, he sends it to me— its far more work ... I won't use the personal file (Merry).

As noted, the teacher-educators who represented the organisational mode conducted personal interaction only in isolated cases and it was impossible to create a dialogue with the group

Interaction only relates to Academic Subjects

The subjects that they discussed in the forum were limited to academic subjects only. They chose not to enter into sensitive and/or social subjects with the students. They thought it was important to maintain and protect their time and the students' time and found the justification for this in the students' age and the short time that they had available. They prevented any social connections between the learners and also if a student dared to raise a particularly unfitting subject they gave support to a peer who complained about it not being the suitable place for this and that this wasted the students' time.

I'm not sure that there is room for emotional support for the students in every course, I don't see my role as a class teacher ... I know that there are teachers whom I know who act as their class teachers within the net and I do not (Elsie).

*You're talking about a course, where each course that I provide in the semester is something between ten to thirteen sessions. There isn't a lot of room to open social matters ... **and now when someone asked ... a personal question, so someone else wrote to her, I would ask you not to put personal matters on the forum and send it to the teacher. Really good, I was really pleased with that** (Eileen).*

Their organised and efficient work helps these teacher-educators to concentrate the interaction with students exclusively on academic issues.

Face-to-face Sessions relate to Academic and Organisational Aspects

Teacher-educators using this mode only conducted two face-to-face sessions. They all conducted the compulsory sessions, determined by the college, at the beginning of the course, in the first lesson and at the end of the course in the last lesson. The subjects dealt with in these sessions related to management and organisation of learning. The face-to-face sessions were steered to the subject of organising work regulations. The first lesson of the course which was also face-to-face dealt mostly with subjects concerning the determination of

clear uniform work rules, the type of tasks, compliance with the timetable, presentation of the site and training the students to use the technological space. As noted one of the goals was to save the teacher's time in the future and the time of the student and to achieve maximal effectiveness for both sides, while creating mutual trust between the participants. They were 'pressed for time' in the first session. The time aspect was critical in this meeting. They had to manage to transmit all the organisational information and they were anxious that the student would remain without sufficient information concerning this subject and would have difficulties during the course. A short part of the first session was also devoted to getting acquainted with the students' names in order to gain their trust and to create an initial familiarity between them. They thought that it was very important for the students to know each other's names and thought that this provided an impetus for future peer learning.

*In the first session, its already actually a definition of expectations, going over the course syllabus, to show them with their own eyes where the course can be found, how to enter it, to say what they can do and **many, many other organisational aspects**... in the first lesson I always feel **pressure to manage to do all the organisational aspects** and that everyone will know what they need to do and that they should know to whom to turn if there is a problem etc (Eileen).*

The second face-to-face session took place at the end of the course and was steered entirely to learning lessons and deducing conclusions. The teacher-educators received feedback from the students with the aim of improving their functioning, organisation and teaching in courses in future years. Even the collection of data and feedback was pre-planned and pre-organised. It was conducted through a questionnaire prepared in advance, having assessed ahead of time on which subjects they would like to receive clarification and feedback from the students.

And the last session is summaries, conclusions, problems (Zinnia).

To summarise: teacher-educators who employed this mode focussed on effective organisation and management. They devoted little time to creating a personal interaction with the learners. They used communication tools on the Internet such as e-mail to sort and select which of the learner's learning needs should be considered and disregarded social or emotional needs.

4.3.3.4 Technology Users

Dealing with technology takes time. As noted, in this mode the teacher-educators tried to save their time and so they chose not to deal with or to be involved in technological matters; devoting limited time to the whole technological issue. This was expressed throughout the whole preparatory process for the course and the site and later in the teaching method. The result was that they decided not to deal with site construction, uploading of materials and updating of the site and they transferred the whole subject of the site and its maintenance to the care of the technical support staff. They did not perceive their role as site constructors or maintenance staff. Nevertheless despite the transfer of authority they verified that a high level was maintained for performance and final appearance of the site. The process was accompanied by meticulous and exact explanations to the technical support staff so that the site would be satisfactory for the teacher-educators.

*The moment that I see that there are too many technological problems that I don't know, I talk with the technicians, **I don't think that I have to wear the technicians' cap** ... Its preferable to send all the changes to the technician instead of sitting to do it. **From my point of view I don't have time for it**, I have many other things to do ... I gave the contents; they uploaded the contents onto the site (Merry).*

As a consequence of this approach they did not respond to students' needs concerning technological subjects, but referred them to the technical support staff.

I distribute a page to them with all the addresses, telephones and hours when they can receive assistance (Eileen).

To summarise: their desire for effective organisation of their work and teaching prevents them from broadening their knowledge and personal use of the technology.

4.3.3.5 Summary of the Organisational Mode

The teacher-educators who adopted this mode taught 'education' disciplines and had in the past used frontal teaching. They saw their main role as the organisation and management of teaching and learning and used technology for this purpose.

The desire for efficiency and time-saving led them to reduce the number of tasks, focusing especially on group feed-back, avoiding consideration for individuals. As a result of their approach they do not relate to non-academic issues.

In the technological field the teachers used only two data representations: writing and reading. They uploaded the materials to the site through the technical support staff and avoided any personal technical support for the students. Their investment in one academic year in on-line teaching produced benefits in the subsequent year since the materials and the tasks were already on the site and the timetable was fully planned and also appeared there.

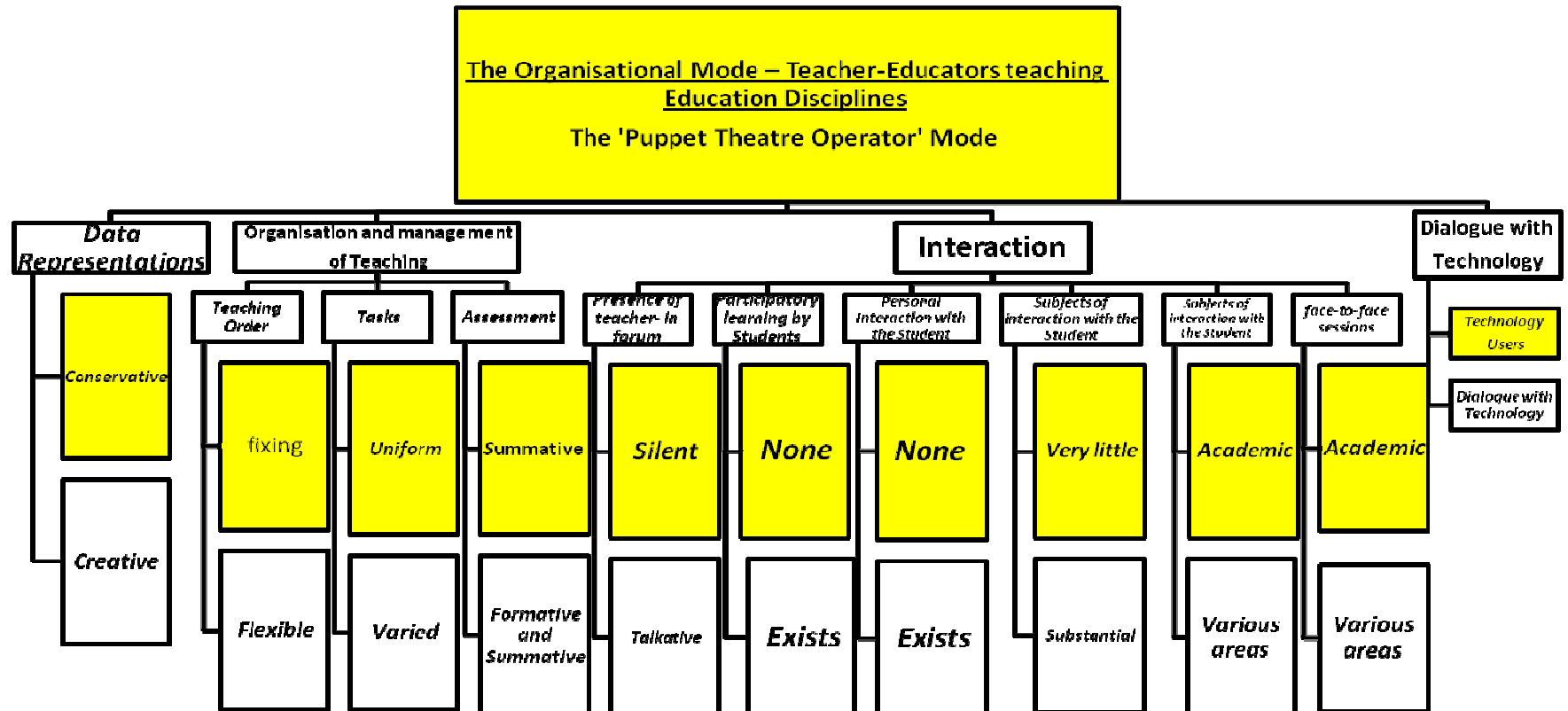


Figure 4: The Organisational Mode

4.3.4 The Holistic Mode – characterising Teacher-educators teaching Education and Literature - The 'Mother Goose' Mode

Three teacher-educators, who taught groups of up to 35 students, were found to use this mode. They taught subjects in the discipline of literature, such as the construction of knowledge in literature and subjects in education such as 'class education' and 'familiarity with the learning environment' which were in the past taught in workshop lessons while offering opportunities to the students to experience different teaching practices.

The emphasis in these lessons was on the interaction between the participants. This was expressed in three dimensions: the teacher-educator with the students, the teacher-educator with an individual student and students interacting one with another. In the transition to virtual teaching the teacher-educators tried to maintain the emphasis on interaction, and in the absence of face-to-face sessions they harnessed the possible range of technologies to bridge the gap and with their help created deep and intensive relations in all sorts of interactions. They offered the learners a large choice with regard to scope, variety and accessibility of the materials. They knew and commanded the technology well; they were enthusiastic, they tried to think about continuous developments with possible advanced ideas and applications of pedagogic technology, creating virtual channels of communication and using a wide range of tools and software in order to enrich the vast reservoir of data representations and to organise the learning.

*My role is to develop knowledge on the subject that I teach, deeper understanding in the sense of a professional teacher, an educative teacher, to relate to one another, to smile, to hug, to conduct an interaction with one another, **the same pedagogy, just to achieve it better** ... you have to remain alert with regard to everything (Fay).*

4.3.4.1 *Creative Data Representations*

Teacher-educators who used this mode were determined to grant students the possibility of choice out of a wealth of existing materials. They themselves, continually learnt, refreshed their knowledge and searched for other possible ways to present the data. Thus they tried to increase the level of stimulus, interest and comprehension and tried to simulate the true reality to enable the students to feel that they were not alone. In this simulation they used concepts, pictures and reality from other worlds. The representations helped them to explain, demonstrate and broaden the options for data representations that were available to the learners. Recently they had begun to use 'Intrawise' (software) in order to conduct a synchronised debate and to provide a response in real time for the students' needs. In addition the students were able to return later and hear the lectures and discussion several times during their spare time.

The technology and wide use that was made of a range of tools and data representation options contributed to an improvement of the student's comprehension of the material. Using the technology they also enabled each learner to learn in the manner and style that was most suitable and preferable for him and this helped them to mediate, and provide knowledge and comprehension for the students regarding the learning material. Their work was characterised by flow and structuring during the academic year and the teaching of the course. They arrived with the learning materials but were willing to alter and adapt the contents and to relate to influences of other learning environments, and to combine them with current subjects while following-up and supervising each learner. They were continually alert so that they saw when a good interaction was not created between the learning material and the students and they searched for and suggested other alternatives to the student that would perhaps be clearer, and would be attractive and helpful to the student and supply the necessary reply. They adapted the course for each learner individually. They thus tried to channel the studied subjects into the student's areas of interest and specialisation. In the area of content they presented the learner with a wide range of subjects, articles, references and links, and if necessary translation of materials from other languages. They combined very many authentic materials. The huge variety and choice that they

presented to the learners was only restricted by ethical considerations and copyright.

To make personal adaptations to what is appropriate for them (Lee).

This variety of data representations served as a means to provide different explanatory channels. They manoeuvred between the wealth of representations in order to illustrate, explain and teach better. If they saw that a particular representation did not contribute to comprehension or learning they immediately searched for another representation that would support the process. The pictures served as a means to facilitate communication between the students and to air their feelings. They showed them pictures as a means to develop their thinking, to consolidate an opinion and as a tool for peer learning. They invested time and thought and prepared illustrations by themselves that would support comprehension of the learning materials and bring the learner closer visually to the materials and contents.

There are those who need to see it with their eyes and there are those who need to hear ... you have to see how all the styles of learning take on a different significance ... and I saw that this was not right, I went and made a gallery of pictures ... there were things which necessitated that I adapt myself to the learning style of the learner and it couldn't be helped ... to correspond with Madame Bovary - this was difficult Internet work. To rearrange a picture album of Jane Eyre that fell and spilled out and needed reorganising for the family and to write a title under each picture - this is classical for Internet. (Lee).

They used simulation as a means to explain processes. They themselves underwent similar experiences in order to transmit and teach the process to the learner in maximal depth.

In the representation you see the 'pilot' from the college (they prepared a representation of distance-learning as a flight simulation) and she needs to know what were the goals and the objectives, the space and what control they had of the system, what her capabilities are. For this purpose I sat [and learnt the subject] with two pilots ... and then, here, this entire

learning environment, everything that exists in the course was presented through the flight simulation ...Since teaching through the computer is teaching through the eyes alone you need to construct it so that it will be friendly to the eyes so that it will be possible to flick through it with your eyes (Lee).

All the teacher-educators who used this mode saw the use of the variety of data representations as an important supportive means for the teaching and learning processes and felt that the sky was the limit with regard to the profusion that they wanted to learn, to get to know and to include in the course.

To summarise: the teacher-educators who used this mode were creative, and curious and they harnessed a large wealth of data representations that created a technological environment in which it was possible to vary the expressions of their thinking and realise their desire to create simulations similar to real-life reality in order to diminish the students' sense of isolation while learning at home by themselves. They harnessed technology in order to create a wide variety of data representations.

4.3.4.2 *Open and Flexible Organisation and Management of Teaching*

The teacher-educators who used this mode employed organisation and management as tools to provide a supportive management system that helped the teacher. Using these tools they succeeded in guiding processes of order, organisation and work regulations. They harnessed technology to manage the students' grades, dates and frequency of each student's entries. This environment enabled the teacher-educators to see the data in a number of presentations: tables and graphs. From these data they constructed the learner's profile. As part of the organisational and planning approach they gave a detailed work programme to the students. A task was set for each stage and its value within the final grade for the course was specified. In addition they shared the whole course programme with the students so that they would know the grades required for each task and could organise themselves and plan their time. Since they used 'HighLearn' they succeeded in reaching a very high level

of organisation and follow-up after each learner. This contributed to a well-organised framework for the course and set the boundaries of time and compliance with the timetable for the students.

Organisation of materials according to subject was facilitated by 'HighLearn'. A discussion group was created for each subject. HighLearn facilitated the easy opening of a large number of discussion groups so that

Every time I open a new forum and I also write who is responsible... and I go in and I read it all together ... and later I react (Fay).

The forum was maintained over the whole period of the course and even after it ended. This organisation allowed each learner to return at any time to read the discussion of a particular issue, and the learner had the option of reading a shortened version, the opening message and conclusion of the teacher.

Using technology, these teacher-educators presented the learner with a wealth of materials, links to other sites and many data sources. The technology enabled them to provide the learner with a rich variety of subjects that they would be unable to grant the learner in traditional learning settings. This wealth and abundance influenced the order of teaching and the order of learning. They allowed the students to choose the extent of depth and familiarity that each student would have with these materials. Following conversations which they held with the students and from their observations and follow-up of the learning process they understood that they had to adapt the learning programme and the learning contents and to alter the order of subjects according to the learner's needs at any given time and in accord with the materials to which the learner had been exposed. Therefore every year the course tended in another direction according to the character of the group and the subjects to which the students had been exposed and reached. Although the course was constructed with a general framework and a defined learning programme, the specific contents were created according to the students' needs and the direction in which the course developed. Nevertheless they constructed a sequence of knowledge for the students by turning data into knowledge and filling in the gaps.

*I understood that when I spoke about constructivist teaching and about the students' choice and about a wealth of materials and about the possibility that people need to choose according to style, according to inclination according to understanding according to the place where they are, and [that they are] not [just] some funnel through which I strain things because I have an hour and a half lesson, that **here I had an opportunity to do it**, that I could give a lot ...**the site is full ...for the next five or six years** enabling them to continue to learn only with the materials that already exist; I update them all the time, **this wealth creates a sort of richness that cannot be transmitted in any way in a classroom and also the deliberation** ... In parallel, I began to think about the construction of the reader's knowledge because after fifteen years of different teaching I suddenly revealed all sorts of possibilities that this technique gave me that I hadn't had before and things that I really wanted to do (Kirsten).*

These teacher-educators saw the students as partners, and they actually constructed the site with their help during the semester so that large parts of the contents, concepts and sources of data were in fact the students' products and materials that learners upload onto the site. Thus they created a new mode of teaching. The site was not exclusively that of the teacher-educator but rather it was a joint product produced with the students. Each course received a different character, direction and emphases according to the specific population learning in that semester.

On my site large parts of the site are their materials whether it is 'personal files' or 'tips corner'. They are partners in the construction and thinking and each year it alters according to the students studying in that year (Lee).

To summarise: This mode was characterised by an obviously large extent of flexibility employed by the teacher-educators and this enabled the students to enjoy a wider learning space with more possibilities and broader horizons. The use of open and varied methods of teaching management within the possibilities offered by technology transformed the students into active

participants in the management and leadership of the course, the contents and initiatives. During this process they allowed the students to lead while they themselves, the teacher-educators stood back.

The Provision of Varied Tasks

The teacher-educators' flexibility and openness led to a combination of authentic materials and personal adaptation for the learner. The difference was in the provision of tasks, their type, frequency and scope. It was not only that the tasks were not uniform, but they were not determined in a strict timetable. They changed and were dynamic in accordance with contents, needs and the learning progress. Thanks to the technology they succeeded in reaching high levels of thinking and analysis that they could not succeed in reaching in traditional teaching.

When I allow them to surf and to choose criteria for a good site by themselves ... and on the forum to speak about it before they set up a discussion and explain it to me ... the reactions to this task told me that this was going to be something new (Kirsten).

Formative and Summative Assessment

Teacher-educators who used this mode acted according to a holistic approach, and provided a response appropriate for each student's needs and personal abilities, flexibility regarding the choice of learning subjects and options for making corrections even after the task had been delivered. Each of these activities enabled the learner to perform the task a number of times and each time to receive formative assessment until the final stage when they were given a summative assessment for their products.

4.3.4.3 *Multiple Channels of Interaction*

All the teacher-educators who used this mode thought that an important part of their role was to connect the process to the people. This connection was very important and significant for them so that they established a dialogue between the process and the students but it remained under their strong internal control. They often took advice from the students and were open to learn new things from them. Their motivation for this was because they perceived the joint construction of a learning community as something very important. In order to establish this dialogue and partnership with the students they were very supportive and innovative, they guided them and ensured a tightening of their own interaction with the students. At the same time it was important to them to develop the relationship between the students. In their view, peer learning was an important value and they guided the students to share their learning in couples or teams, thus providing support, follow-up and a response on all subjects.

They exploited all the technological tools such as the forum, 'Interwise' and the notice board in order to advance the presence of a social process, to encourage mediation between the students and to help to create relations between them. These relations were perceived by them as an important component in the teaching process. They were pleased that with the use of technology they could realise this right to peer interaction and activate it in the best possible way. At the same time they were attentive to each student and ready to respond to his requests in all academic and non-academic fields while maintaining borders and order. They succeeded in reaching a high level of familiarity with the students. They saw this as an important achievement and realisation of one of their guiding pedagogic principles.

I think its important that there is interaction in the course between the learners, they learn with me in couples or threes ... the courses in distance-learning allow me to perform the pedagogic element in a better way ... I learn a lot of things from them (Fay).

This work mode that encouraged strong relations between learners led to the alteration of the teacher-educators' position in relation to the students. They

allowed the students to lead and to stand at the front of the stage while they become the supporters, escorts, counsellors and teaching agents in the wings. They allowed the students to determine the pace that was appropriate for them. Their move from the front of the stage to the rear took place because of their full recognition and perception of the importance of the learning process in which they acquired very high respect for the students and their knowledge. The dialogue created an experience of pleasure for them and enabled them to enjoy their work.

*I was **exactly like the Pied Piper of Hamelin with blinded eyes** and suddenly I needed to change the stage, to stand back, to construct a flow, to take care to investigate mistakes, to ensure that the gondolas would be beautiful ... **and someone played music and they floated on alone and you stand there with the whole programme, with all the complaints and you can't [just] sit with the tourists** and suddenly the pace of the students, is not your pace and you smile and you are aware that you are with them [but] from behind, you stand behind their backs, **your whole position as a teacher alters** (Lee).*

To summarise: these teacher-educators used this work mode to open a wide and varied network of interactions in the dialogue that they created with all the students who were participants in the learning and they were helped to do this by a variety of technological tools and environments.

The Teacher who is 'Silent' in the Forum but Active behind the Scenes

From the analysis of the findings it appears that the teacher-educators who used this mode perceived the forum as a central tool to promote the subjects of teaching and learning. A similar finding was found for the other modes.

They saw the forum as a teaching and learning resource and devoted much time and thought to it, and to the way in which it could promote a pedagogic process while critically examining the extent of their presence and involvement in it. They utilised the forum for a wide range of functions: initiating, guiding, mediating knowledge, criticising, managing and using it to maintain daily

contact with the students. As noted peer learning and the interaction between the students were perceived by them as a central and important component of teaching and learning. They therefore willingly devoted their time to treating difficulties that were created during the course and expressed in the forum debate.

They used peer learning as a means to mediate knowledge and thus reduced their role and involvement in this subject. They feared that their intervention in the forum might prevent independent thinking, as it might hinder the learner's personal and professional development. They 'talked' relatively little so as to enable the students to think, to create and to be more active. Over the years with the experience that they amassed, a change occurred in their perception of the extent of their involvement in the forum. In the past they 'spoke' there a lot but they understood that they had to alter the amount of their responses because in this manner they had prevented or minimised the learners' right and ability to 'speech'. Now their tendency was to minimise their intervention. They saw themselves as equals to the students and this was expressed not only in the frequency of their intervention but also in the type of intervention that they provided in the forum. They entered the forum each day, they read and followed the students but without leaving 'traces'.

*I think that a teacher needs to learn and there are many things to learn and **one of the only ways to learn is from the students, today it means being a partner in their forum** ... I understand that if I am silent more they are more active and bring new materials. I read it all ... if I hold back and intervene with them less in the forum, they learn more ... because at first I was quick to participate ... and I didn't understand that my word was so potent that it simply silences them all (Kirsten).*

To summarise: these teacher-educators perceived that the forum was the main tool for the promotion of the teaching and learning. They used it for several functions. Although they very frequently went into the forum, nevertheless their presence was hidden in order to enable the community of learners to 'talk', think and develop.

Support for Collaborative Learning

These teacher-educators thought that the students' presence in the forum was important and they imparted this message through the group discussions and expected the virtual participation of all the students. The forum served as a platform to enable peer support for learning. They expected to see much activity and connections between the students on the forum. They knew how to identify critical points from which no peer learning would emerge and treated them individually opposite the student involved or tried to find a remedy of some sort.

The forum provided the students with a platform on which to act and thus encouraged them to grow as leaders of a small community of learners or of all the course participants. They allowed the students to lead the learning by giving them the opportunity to bring their own materials and ideas and to lead the entire group of learners with these materials. They noted their sense of satisfaction when the students successfully led the discussion.

I allowed her to manage the forum, what she only put in there! – the king of the forum, king of the week – there were many entries and people competed a lot who would be the king of the week and [received] compliments and she did amazing work, simply amazing (Lee).

The main feeling that emerged from the findings was that the group discussion provided all the teacher-educators in this mode with the sense that they had become better teacher-educators. They achieved this through the understanding and human warmth that was embroidered between them and the students.

From a conceptual cognitive point of view, with regard to conversation, I am talking all day, I just don't talk with my voice but through this [virtual] means – its simply unbelievable – the group discussion enables me to be a better teacher ... I'm far more egalitarian ... in the conversation of the discussion groups I stood up and said: 'I need everyone to be there' ... and I explained to all the students that there can be no such thing as to disappear, or in my opinion that if you disappear, you [should understand

that you] disappear from the group because your mind is missing from the group (Fay)

The forum made a further use of peer learning, as a means to overcome the students' resistance to the workload. By promoting the subject of peer guidance and giving the student reinforcement to lead a group through the forum, they reduced the number and type of complaints by students regarding the task workload.

Here there can be no tricks, there are requirements, there is a forum and here when the need is created someone takes up the gauntlet and does the work for you, most of the girls agreed with him, because they said we didn't think about it that way, we didn't see it like that, that's something that can happen but only on the forum of an on-line lesson (Kirsten).

To summarise: they saw the collaborative learning of the community of learners as one of the pillars of their distance teaching and learning. They harnessed the on-line forum as a virtual, meaningful and central meeting-place that constituted a foundation for collaborative learning.

Personal Interaction with the Individual Student through many Channels

As in the Interactive mode, the teacher-educators, who used this mode, thought it was very important to provide personal consideration for each learner and devoted much time and thought to this. But in contrast to the Interactive mode, here the teacher-educators created a close, multi-channel interaction in all areas and not only in the academic area in relation to the individual student and to the whole community of learners. They were able to use this teaching style due to their use of virtual technological tools that used time in a versatile manner so that they could and were willing to provide a response for each of the students.

The teacher-educators harnessed a large number of technological tools such as: e-mail, a personal file and 'Skype' vocal communication through the Internet so that they could maintain a very frequent personal relationship with each student. The personal interaction with each learner covered a number of areas:

academic, organisational, personal, social and emotional. This was a deep relationship that included consideration of academic and also non-academic areas. They provided support for all life areas including those which were not connected with teaching the discipline. They were attentive to every problem and knew the student's life style and personal events during the studies in the course. Using written language they tried to compensate for the lack of a physical contact, facial expressions and body movements. This written language facilitated a closer intimacy with the student.

Part of the interpersonal dialogue was devoted to the treatment of individual problems with sensitivity for the learner's difficulties that might interfere with the learner's studies. Using interpersonal dialogue with each learner they succeeded in bringing the student to agree with and understand the whole process. In cases where they encountered resistance to transfer personal information to the group discussion they suggested a compromise: to talk about the subject in general in the forum. In this manner they used their individual relationship with the student to channel matters to peer learning and taught the student this learning mode.

It is actually on the teaching level, that I can reach each one ... I can ask the student to transfer material from a file to the forum, so that everyone will learn, they can refuse and then I say if it is private, then discuss the general subject in the e-mail (Kirsten).

They also harnessed the virtual communication media in order to provide a response for students with special needs, so that they related individually to each of the learners according to their difficulties and disabilities. They offered assistance and help to students who had difficulties in getting organised whose problem was made more severe in on-line learning, in which the teaching and the instruction were in written language only. Each student was respected, for example support was provided for a student who wrote with spelling mistakes so that he would not be afraid to publish his writings on a public stage, on the on-line forum. The personal virtual communication that they conducted with each student enabled them to expose difficulties and problems, and to respond to requests of learners from other streams and courses to join the on-line

course. They listened attentively to new immigrants who had difficulty with the written communication (a million immigrants from Russia have immigrated to Israel in the last twenty years and they now constitute a sixth of the state's population), and adapted learning material for them. They saw it as their role and duty to assist students who missed studies because of personal reasons.

As for those with learning difficulties there is no discrimination because of spelling mistakes ... the idea [is important], he [the student] spoke and presented it in a garbled manner, but he presented the idea for consideration by a friend ...I don't explain and don't treat it, but I want him to feel comfortable and to write ...I have students who are new immigrants, what spelling mistakes they have! ... which makes me think and understand the content differently when I read it. I take the word as it is. Someone wrote about the mother of a girl who I understood had become pregnant. It took me time to understand that I had been misled by the mistaken spelling of the word, the girl was not pregnant but had committed suicide and the situation was far more dramatic (in Hebrew the difference between the word pregnant and suicide is one letter) (Fay)

Personal contact with each student enabled them to provide a 'lifeline' to students whose achievements had been very low so that they had been candidates to be ousted from their studies in the college. Using a personal relationship, daily contact, provision of support, follow-up and assistance, the students began to learn better, to receive higher grades and this removed the threat of having to leave the college.

And I can show you girls who were on the verge of being thrown out of college and in a very, very quiet way, I managed to support them and to guide them step after step so that they could comply with the academic requirements (Kirsten).

The teacher-educators used e-mail as a tool to strengthen their interpersonal interaction with the students especially on subjects for which public exposure would be inappropriate and when there was a need to maintain the student's privacy.

I send him e-mail ... I ask him what happened to you? ...he had two more difficult weeks and I accept that. His father was in hospital (Fay).

As noted, teacher-educators used the student's personal file (an interactive workbook) in their work with an individual student. This was a virtual communications exercise-book that facilitated communication between the teacher-educator and the student and was used to help to improve the student's learning ability and raise the level of the student's products and accelerate the learner's progress. It was also the tool that the teacher-educator used to resolve personal problems with the learner in non-academic areas. They thus managed to provide private teaching for each learner according to the learner's abilities, understanding, willingness and perception.

***I had to reinvent myself as a teacher** ... [and learn] how to react with humour and to react to everything ... today when I begin to work with personal files in addition to the e-mails and the forum **I begin to reduce the gaps**. It's something that was similar to what were once called 'communication exercise-books', it provides a channel for communication for two pairs of eyes which is different, very intimate and nobody apart from me can see (Lee).*

It also provides the possibility that I always dreamed of and that's to relate individually to the position in which each one stands (Kirsten).

Recently, an additional channel opened using the vocal communication of Internet software that enables the student to talk with the teacher for unlimited time and with no financial cost. Thus, when the student coped with new material or the fulfilment of a task and had ideas concerning the subject, this could be discussed with the teacher and the student could simultaneously receive counsel, support and assistance in order to progress and complete the tasks.

I introduced 'Skype' and the students can turn to me all hours of the day on condition that I am next to the computer and that 'Skype' is open (Lee).

The transition from work opposite a group in the forum to individual work led to uncertainty for the teacher-educators. Should they put more emphasis on the public discussion thus enabling them to reach a higher level of conceptualisation, making it possible to hear and to relate to a variety of opinions and attitudes so that the discussion might be very productive, or should they give personal consideration to each learner in order to avoid injury to their right to confidentiality?

This subject was discussed in an on-line teachers' meeting. They expressed an approach that supported public exposure of learning difficulties because of the perception that all the other participants would gain from this.

Students write about their own emotions, feelings, thoughts and behaviours in events from the field. These incidents are not always complimentary, they don't always want to write in a considered and orderly way, but rather with anger, with a sense of collapsing under the burden, amazed, helpless ... and I think that it is she who gives a perspective on her colleagues, supporting, varied and enabling the writer to unload the incident and to 'dive down' into the incident with different 'glasses' ... I ask them to write everything in the group discussion. With regard to personal problems (death, sickness, depression ...) it's the learner's decision. Even these can be shared with the group, at a certain level and they can receive support, understanding, consideration, assistance (Fay).

To summarise: the view of the student as an individual, distinguished as unique among the other students and the desire of each student to learn through a variety of technological options, constituted the guiding principle in the teacher-educators' perception of their function. Thanks to technology they were able to promote personal interaction through various channels and provide a response to the students' many different learning styles and levels of ability including consideration of issues that were not related to their studies. They employed the technology to relate to the needs of the discipline, and also to consider social and personal issues, which were all intertwined within the multi-dimensional texture offered by the technology.

Interaction with the Student in Non-academic Channels

As mentioned, analysis of the findings showed that all the teacher-educators who adopted this mode thought it important to foster relations with the students and to be attentive to non-academic subjects. They supported integration of the social and academic areas and saw them as supporting one another. They perceived the combined consideration of learning contents and non-academic subjects as a winning combination.

They provided the students with a virtual platform to raise non-academic issues through an on-line discussion group in which they revealed strong sensitivity and when necessary provided their opinions and support. If they felt that the group should conduct a dialogue in a particular avenue they assumed the leadership and led the forum's direction. When relating to the non-academic, personal area they treated sensitive issues, yet maintained clear boundaries throughout the provision of assistance, support and intervention. Since they were attentive to the students' stories they knew how to discern the events in the students' private lives that influenced their ability or inability to take part in their studies during a particular period of the course,

*For me pedagogy and social matters go together. I need him [the student] to feel comfortable ... **I open a social discussion group, where I become more active if the group does not take off** ... A student wrote about her friend who was killed in a car accident. Three months ago she danced at their wedding ... and she wrote there **'the world is dead'** ... what is my role in this scene? First of all any message like that, the moment it is written, directly carries things with it, affection and love and this ... I wrote to her cognitively about the stages of bereavement, and I referred her to a site on the Internet where this is detailed. How to cope with stages of bereavement and she said that it was very appropriate for her and she printed it and she talked with her friends about it (Fay).*

To summarise: their consideration of the students as a group and of the learner as an individual was part of a holistic approach and thus they provided a response to the learners in a variety of areas.

Face-to-face sessions relating to multiple aspects

As part of the teacher-educators' holistic perception, the first lesson takes place in the college as a face-to-face meeting.

These teacher-educators used a holistic approach to determine components, objectives, goals and ways of action even in this first lesson. They devoted the first face-to-face session to a number of aspects: social, organisational and learning. They usually began the session with the social aspect: getting to know the participants and introducing the learners to their colleagues. In this way they tried to create a pleasant atmosphere and give a sense of personal confidence and a good feeling to them all. From the organisational aspect they distributed the timetable, explained the course goals, objectives and the manner in which the course would progress and the organisation of learning. Technologically they introduced the students to the work environment, presented the possibilities that it embodied and suggested a comfortable and effective way to use it. From the academic aspect they tried to give students 'a taste' of the studied subject. In this first lesson, they already tried to present things in a creative, different and attractive manner enabling the students to have a glimpse of the basic foundations of the course, its teaching methods and learning forms within a period of an hour and a half.

I come there, receive them, and talk with them about everything. It's a social discussion and they write. I come home and I see who wrote – who is there. I don't need to check who was present (Fay).

Additional face-to-face meetings did not always take place during the semester. They only occurred when the teacher or students expressed a need for it. If an additional session occurred during the course it was devoted to thickening learning contents while providing time and space in the session for social interaction between the students.

So they almost hugged and kissed there because it was the first session in Semester A ...they're not one class and they are in all sorts of streams so that it was a very emotional meeting and it took me about twenty minutes until I began to read text (Kirsten).

The last face-to-face session at the end of the semester was devoted by the teacher-educators to an academic and social summary and provided a platform for all the students to express their opinions, feelings and emotions using creative means. The last meeting was a reflection of all the areas that the teacher-educators had considered during the course.

The last session – uses creative work: items or pictures or boards or cards they examine what we have taken and what we have left; both things relating to computerisation and also things relating to contents ... at the end of the course I brought them gold-painted walnuts. Each one had to choose the walnut which was the most difficult to crack (Lee).

As noted these teacher-educators sometimes conduct a number of face-to-face sessions, usually more than is required by the college regulations. The sessions are either individual or group sessions and also provide a response to other areas apart from the academic aspect.

4.3.4.4 *Technologically-oriented*

The blend of technology and pedagogy used by all three teacher-educators who used this mode was a comprehensive blend and encompassed many areas to which they tried to relate in depth. They saw technology as an important component, influence and variable. It was a part of their considerations at each stage of the planning, and throughout the performance including the teaching method. They saw the decisions, applications and performance of things in the technological area as their territory within which they were the determiners, the deciders and the choosers. They continually thought of improvements in the technological field and found that the technical staffs were willing to listen to them. In this mode the teacher-educators independently uploaded their materials on to the site without the mediation of the technical support staff and they changed it all the time in order to respond to the students' needs.

Their view of their responsibility as distance teachers also included technological issues. In their vision they envisaged the uses of additional

technological tools to improve their teaching and provide solutions for unclear subjects, concepts and areas. They especially tried to compensate for the lack of face-to-face contact and other components which had strengthened the relationship for better understanding that existed in traditional teaching.

*I decide, nobody can decide this for me, it's in a teacher's guts – the teaching ... **I choose the tools according to what is fitting at that moment for me, for the character of the course, some according to what they offer me, some according to what I want.** I send a request [for technical support] if possible and usually I receive it ... the expectation from my job as an on-line teacher is that I should have a platform that will also enable conversations like in 'I Teach You' ... [In my vision] I see the college as a very professional on-line centre which provides a response ... use of a wide range of computerised technologies from video conference until 'I Teach You' a serious hi-tech centre, that trains teachers and even gives courses and opportunities for participation of teachers in the field, as partners in this computerised learning (Lee).*

Teacher-educators who employed this mode related to the technology in a holistic manner, so that they perceived it as part of their responsibility and duty to provide assistance, support and back-up for the students. They provided a response to the student in all areas connected with distance-learning from problems regarding their ability to communicate on the Internet to the difficulty of entering through a password. Their fierce need to supply complete support and assistance for each student at any time was obvious. Their support was enhanced by the confidence that they gave the students in the on-line work environment and the finding of creative solutions for difficulties.

My roles are also organiser and technician; I have to open their technological environment. To ensure that technically everything will work and not hold them up ... everything apart from buying the student the computer for his home ... a student wrote to me: I am way out there in a small village in the middle of the Negev (the desert in the southern region of Israel, often with slow connections to the Internet) I didn't understood

*the relevance, because she has an ancient Internet connection that runs like a tortoise ... she doesn't have a high speed Internet connection. I explain to her what is about to happen to her, saying that she shouldn't give up. I explain to her, I wrote to her to press on the Internet page, until it comes up, you can [meanwhile] do something else and return to the Internet when it is done. Do your work in 'Word' and note when the page appears – that means ... **everything, everything, everything, just everything...** I was the one who sat down and opened it [the site] for them. I don't turn to anyone to give me a username and password, I register them, I see that some are not registered so I register them, and afterwards I connect to the course (Fay).*

Their high level of familiarity with work with technology, their control of the tools and willingness to continually search for and learn new technologies, while helping the students to cope and solve problems through the use of the computer was a central part of their perception of their teaching mode.

4.3.4.5 Summary of the Holistic Mode

Teachers-educators, who used this work mode, employed a holistic conceptualisation and operative style in all areas: many advantages are delineated for the teacher-educator and for the student. The wide use that was made of technological tools and the immense investment by the teacher-educators in thinking, time and frequent connections with the students enabled them to provide personal consideration for each learner. Using a range of data representations they achieved variety, created interest in the learning of subject-matter and adapted the materials to the different needs of the learner and the different styles of learning found among the diverse student populations. This process enabled flexibility regarding the studied contents and left room for creativity by both teacher and students.

During the learning and focussing on the contents they exposed the students to technological innovations and provided them with tools in order to overcome the difficulty caused by the lack of physical encounters. Yet on the other hand

the responsibility to find materials and to upload them onto the site was not only imposed on the teacher-educator but also required from all the students.

This mode also entailed difficulties. An enormous investment of thinking time and attention and emotional energy was continually demanded throughout the teaching process. The tremendous work load in one single year did not always produce alleviation in the subsequent year since the materials altered; sometimes also the subjects. The flow of the course was linked to the students that studied in that particular year. In fact the teacher-educator had to prepare most of the course anew each year.

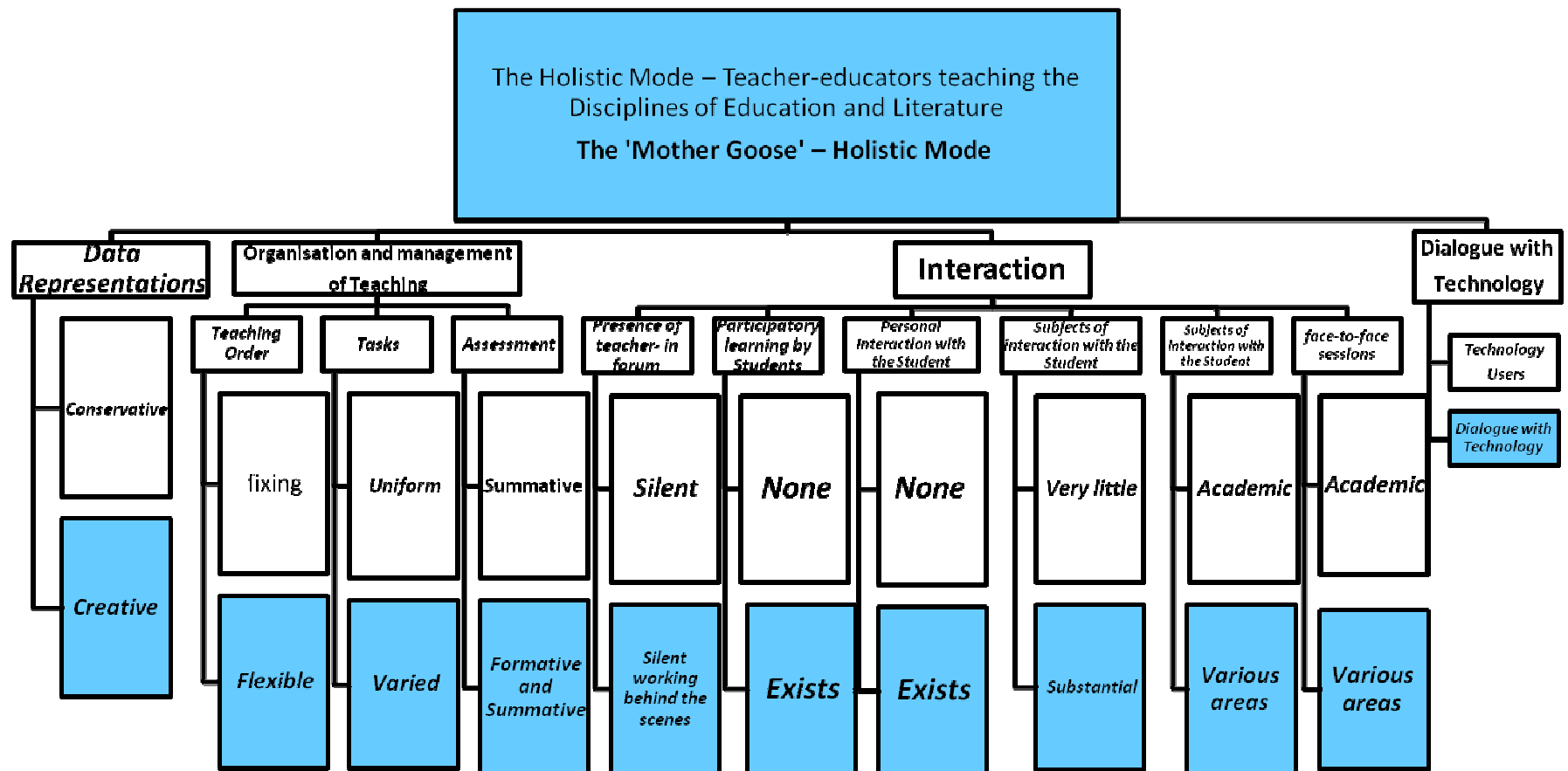


Figure 5: The Holistic Mode

4.4 Chapter Summary

The findings indicated common motives for the teacher-educators' transition to distance-teaching. The teacher-educators' intrinsic internal motives stemmed from curiosity, a desire to learn something new, a sense of responsibility and a desire to lead their students to become 21st century teachers. In addition they were also influenced by extrinsic external motives such as the college's desire to reduce the number of hours that the students spent in courses within the college walls. In some cases their entry into this role stemmed from a combination of these two types of factors such as exposure to the subject when they were students or lecturers in university together with the appeal of the college following their receipt of funds to promote this area.

The acquisition of knowledge and expertise needed to become distance teacher-educators was carried out in an unplanned disorganised manner and was drawn from three main sources: knowledge that they acquired by themselves, knowledge that they acquired within the college framework and knowledge that they acquired within supportive settings outside the college. The acquisition of knowledge, and the internal and external need to attempt distance-learning created a change in their work mode, even in other workplaces.

As noted, four distinct modes emerged from an analysis of the findings. These modes were derived from the academic discipline of teaching.

The Representation mode characterised the scientific disciplines. Here the teacher-educators used a wide range of data representations. The sole source of all the materials was the teacher-educator and all the materials were uploaded before the course began. Teacher-educators often entered the forum and often participated. Teacher-educators chose not to provide support for non-academic subjects. All the planning for the course and uploading of materials was completed before the beginning of the semester through the technical support staff. The use of a wealth of representations meant that they continually searched for new technologies. There was a difference between a course with hundreds of participants and a course with few participants.

The Interactive mode characterised teacher-educators who taught literacy disciplines. Here the dimension of interaction predominated. There was much text writing and much use of formative assessment in order to raise the level of the learner's writing. Since the work focussed on writing this limited the use of representations to only two forms: reading and writing. Consequently the order of teaching and learning was fixed, although in certain cases personal adaptations were made to fit the tasks to each learner. The strong desire to maintain a personal connection led to many entries and reactions by the teacher-educators in the forum but they were limited to academic subjects. The face-to-face sessions were devoted to academic subjects and demonstrations of the use of technology, but during the course the teacher-educators did not perceive that their role included provision of technological assistance, so they did not offer assistance to students on this subject and did not upload the materials onto the site by themselves.

The other two modes which emerged characterised teacher-educators teaching the disciplines of education and literature. The difference between these modes stemmed from the manner of their teaching in the past. The Organisational mode teachers, who had taught frontally in the past emphasised organisation as opposed to the Holistic mode teachers, who in the past had taught their studies as a workshop lesson, emphasising and providing a wide response in three areas: a choice of data representations, the organisation of learning, and interaction. In the field of learning organisation the difference between the Organisational mode and the Holistic mode was that the Organisational mode used only two data representations: reading and writing, as opposed to the use of a wealth of representations by the Holistic mode. The order of teaching was fixed according to the former mode, in contrast to flexibility in the latter. Thus in the first (the Organisational mode) there were uniform tasks with only a summative assessment while in the second (the Holistic mode) tasks were uniform but also adapted to the learner or according to the learner's choice, while learners took responsibility to perform both the formative assessment and also the summative assessment. The difference between the last two modes was also evident in the range of subjects treated in the face-to-face sessions: learning, technology and social subjects were considered by the Holistic mode

teachers as opposed to solely organisational issues by the Organisational mode teachers. In the Holistic mode personal interaction was dominant; there was very frequent entry by the teacher-educators into the forum and support for the students even in non-academic subjects. Differences also emerged with regard to the date of planning and organising the course, the use that they made of technology to upload materials and the provision of technical support to students.

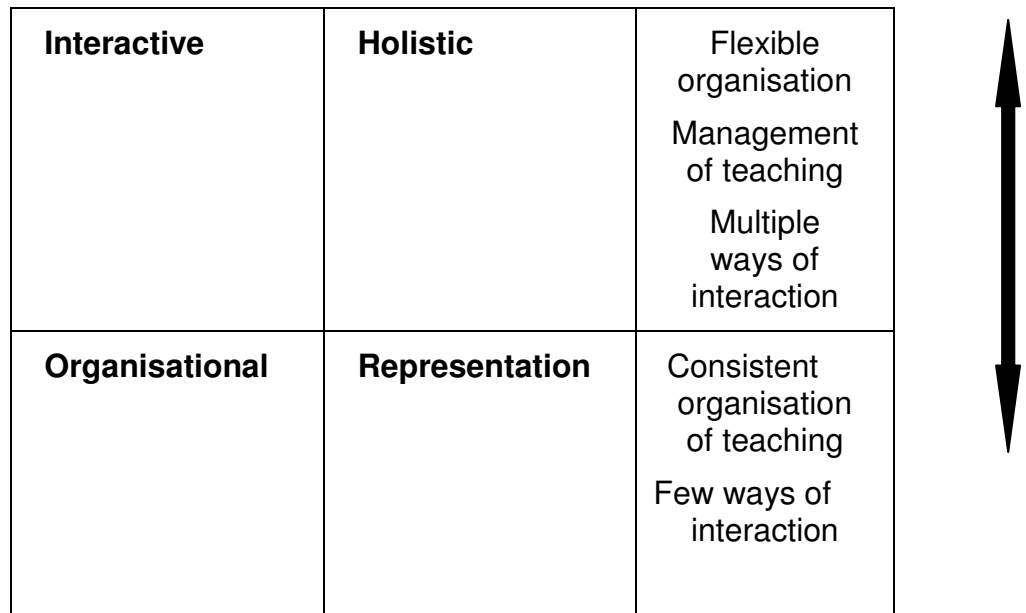
The dimensions of creative data representation and technological-orientation were more strongly expressed in the Holistic and Representation modes. In contrast the Interactive and the Organisational modes were characterised by conservative data representation and defined as technology users. With regard to the dimensions of interaction and organisation and management of teaching, the Holistic and Interactive modes were characterised by intensive multi-channel interaction and open and flexible teaching organisation and management.

In addition it should be noted that opposite measures were found for all the indices between the two modes that represented the education disciplines. The Holistic mode was found to have high values for all the indices in contrast to the Organisational model that was found to have low values for all the indices.

To conclude: Table 7 below presents the four modes according to the disciplines that they represent and their different dimensions. These characteristics form a typology which is represented in Figure 6 below the table.

Table 7: Modes and Dimensions adopted by Teacher-educators who perform Distance Teaching					
Dimension	Modes				
		Representation	Interactive	Organisational	Holistic
Sub-dimension	Disciplines	Sciences	Literacy	Education (frontal teaching background)	Education and Literature (workshop background)
Data Representations	Use of Data Representations	Creative	Conservative	Conservative	Creative
Organisation and management of Teaching	Teaching Order	Consistent and Fixed	Flexible	Consistent and Fixed	Flexible
	Types of Tasks for Presentation	Uniform	Uniform – repeated presentation	Uniform	Varied
	Type of Assessment	Formative and Summative	Formative and Summative	Summative	Formative and Summative
Types of interactions	Presence of teacher-educator in forum	Talkative	Talkative	Silent	Silent but Active behind the scenes
	Participatory learning by Students	None	Exists	None	Exists
	Personal Interaction with the Student	Very little	Substantial	Very little	Substantial
	Subjects of interaction with the Student	Academic only	Academic only	Academic only	Various areas
	Subjects of face-to-face sessions	Academic and Technological	Academic	Academic and Organisational	Academic, Organisational, Technological, and Social
Dialogue with Technology		Technologically Literate	Technology Users	Technology Users	Technologically Literate

Figure 6: Typology of the Teaching Modes



Conservative  Creative

Data Representations

Technology User  Technology -Literate

Technology

The next chapter provides interpretation and explanations that further clarify the different work modes and their composition in light of understandings gained from the theoretical and research literature.

Chapter 5: Discussion

5.1 Introduction

The Discussion is organised according to the research questions. Analysis and interpretation is provided for the findings according to the issues examined by the questions, and these interpretations are compared with extant theory and research. The first question relates to the issue of the common characteristics for all the teacher-educators. The remaining three questions, relate to different aspects of the teacher-educators' different teaching modes, indicating the similarities and differences between them, as they emerged from the findings in affinity with their different disciplines.

The research findings indicated a typology of four modes. Each of these modes was examined according to four different dimensions: the use of data representations; the dimension of organisation and management of teaching; the dimension of interaction and the transformation of the teacher-educator into a technology user/technologically literate. While the characteristics of the organisational and holistic modes used by teachers of the education discipline stand at different extremes along the scales of these dimensions, each of these teaching modes harnesses the technology in an intensive manner to enhance different dimensions of teaching. The representation mode, adopted by teachers who teach life sciences and statistics uses the computer in order to exemplify and illustrate the material and for exercises. The interactive mode aims to improve language and thinking within the teaching and learning process and therefore exploits the possibilities of very frequent editing and correction offered by computer software and virtual communication tools. The organisational mode exploits computer applications and Internet to enhance and guide the management and organisation of teaching and learning. The holistic mode unites all the above-mentioned characteristics with a focus on the students at the centre of the teaching process.

The discussion is illustrated with the aid of tables in order to clarify the analysis and interpretation of the findings for the reader.

5.2 Common Characteristics of all the Teacher-Educators in the Transfer to Distance-teaching

The research findings showed that all teacher-educators had common motives and desire to become part of the new (technological) environment. In contrast to the differences that were found between them according to teaching disciplines in relation to the other research questions, no differences were found in motives and desire to belong to the technological environment between the different types of teachers. Other similar characteristics in the transition to distance-teaching included the manner in which their knowledge was acquired and the way in which they coped with the change. The change created a need to use existing knowledge and to acquire new knowledge so that all the teacher-educators were imbued with a sense that they were leading a change process.

The teacher-educators felt that they needed to alter their teaching style to fit their role as teachers teaching students through distance-teaching on the Internet. This alteration stemmed from internal-intrinsic motives that reflected the teacher-educators' own needs, or from external-extrinsic motives which were imposed on them or drawn from external entities and from a combination of internal and external motives.

Since there was no clear or exact definition for the new role, a phenomenon of 'role ambiguity' was created (Kahn et al., 1964). A lack of intelligible and consistent information relating to the individual's role and the way in which the role should be performed in the best possible manner, including a lack of clear information concerning the role-holders' area of responsibility, rights and duties, causes role ambiguity (Wiesenmayer, Kupczynski & Ice, 2008). This occurs because the role did not exist before

5.2.1 Internal Intrinsic Motives

The teacher-educators, who underwent a transition to distance-teaching, did so for a variety of internal motives. There were those who were curious, aware of the need for life-long learning. All these motives linked up with the fact that youth of the twenty-first century are technology-oriented and their willingness to

use the computer that they embraced alongside their responsibility to train students to become teachers for the new generation. They therefore understood the importance of acquiring computer and technological skills and integrating them within their teaching methods and expressed their willingness for change.

The teacher-educators all completed higher education and felt a need for continual learning so that their professional training had been supplemented by lifelong learning (LLL) (Darling-Hammond, 1988). Teaching in the teachers' training colleges, training the next generation of teachers and educators, they therefore felt dual loyalty to teaching and learning, since they also needed to envisage the needs of the future pupils of these student-teachers. Their understanding that twenty-first century youth are highly knowledgeable in the secrets of the world of technology also influenced their choices (Livingstone & Bober; 2003; Brown, 2006; Fox, 2006; iNACOL, 2007).

Envisaging the new and changing reality and understanding the potential embodied in the use of the network to improve learning and teaching processes, they sensed a need to augment their use of technology. In light of previous publications (Anderson & Kanuka, 1997; Hara et al., 2000) they understood that synchronic and a-synchronic communications and multimedia are effective means to advance schools and their learners and that they could guide the pupils to higher achievements in literacy and mathematics with the assistance of the computer (OECD, 2006). The teacher-educators felt a need to undergo a transition in order to enter this world, to become technologically fluent as defined by Resnick & Rusk (1996), to become 'digitally-literate' (Lanham, 1995; Pool, 1997; Gilster, 1997; Inoue, Naito & Koshizuka, 1997). They understood that the rapid developments in technology, culture and society (Toffler, 1970; Ball, 1987) necessitated a response by the education system and consequently change (Fullan, 2001; Adan, 1991; Ben Dror, 1992; Gur Ze'ev, 1997).

The teacher-educators also understood the immense advantages offered by technology in expanding the space that would be accessible to them and their students, learning at different levels and joining with different communities beyond their school walls. Similar approaches were found in the literature (Schrum & Berenfeld, 1997; Gomez et al., 2008).

In addition to all these pedagogic advantages they also identified an opportunity to find a solution to the personal problems of dividing the home-work timetable and allocating time for their meetings with students for personal tuition (Brown, 2006). There was also an opportunity for students to learn and plan their time as was suggested by Kelly (2002). Several researchers (Fullan, 2001; Mitchell, 1994; Eylon & Bango, 1997; Maskit, 1998) noted that it is impossible to enforce change on the teachers or the education institutions from outside, using an approach of 'top-down', and that the success in introducing a change process into the education system depends on the decisions of the performers themselves, i.e. the teachers. In order to create true change a continuous interaction was necessary between changes in perceptions and changes in attitudes, beliefs and behaviours. Indeed research showed that the teacher-educators wanted to make a change and were open and willing to receive new and alternative teaching methods.

In conclusion, internal motives linked with LLL and the need for teacher-training to create teachers who would be able to provide a response for the children's technological abilities in school engendered the teacher-educators' desire to become distance teacher-educators teachers and to undergo change.

5.2.2 External Extrinsic Motives

There were several external motives that pushed/enabled the teacher-educators to transfer to distance-teaching: the demand by the heads of college departments and streams, shortening of retraining stream studies to one academic year and the introduction of a new learning programme in the regular learning stream, one of whose characteristics was a reduction in the number of study days.

It seems from earlier studies (Ball, 1987; Baal Schem & Shinar, 1998; Ramirez, 2002) that the college foresaw a profusion of advantages in distance-teaching and learning. It exploited them as a response for the reduction in academic time and study days in the college, justifying the change and adaptation of programmes for the students' new needs.

The college deans' pedagogic motives for the transition to distance learning were found to be congruent with conclusions of research literature (Ball & McDiarmid, 1990, Korthagen, 2001) which claims, that early experiences of the teaching trainees serves as a significant breeding ground for the methods that they later conceive and perform as teachers. Additionally, other studies (Gelbart, 1999; Oster, 2000; Nir Gal et al., 2003) have indicated that it is necessary to begin to prepare the teachers for the computerisation reform with basic professional training. The study by Lan (2001) showed that teaching students had not used computer tools in their school practicum since they had not studied in teacher-training colleges with lecturers who integrated computerisation in teaching and so had no computerised model to imitate. In contrast to this, other studies (Mason, 2000; Bullock, 2004) showed that teaching students who had experienced computerised learning in college knew how to implement what they had learnt and used the technology in their teaching in schools.

This issue gains importance since most of the teacher-training students are women. In a study conducted in Israel by Enoch & Soker (2006) relating to the students' participation in Internet web-based instruction it was found that women students were less likely to use the Internet for learning.

Surveys conducted by Navarro & Shoemaker (2000) showed that many colleges and university are involved in a hasty race to develop distance learning systems from their campuses. In Israel, Guri-Rosenblit (2004) warned that fears, hesitancy and lack of willingness to cope with the new tools are liable to harm the status of teacher-training institutes. However the teacher-training college in which the latter study took place is one of the leading colleges in Israel, especially in regard to the assimilation of the new technology, so that it was natural that they should also pioneer distance learning. Moreover

this college was in marketing competition with other teacher-training colleges and higher learning institutions, which also taught distance learning (Nachmias & Ram, 2009). As Enoch & Soker (2006) noted, by presenting the college as an academic institute that also provided distance learning, the college was able to provide high-level lectures and learning materials for all students in all locations of residence.

In conclusion: the external motives mainly stemmed from the understanding that the assimilation of computerisation provides a powerful tool, the advantages of distance-teaching and learning, the need to present an advanced image and to produce benefits for the college, students and teacher-educators and the need to adapt programmes to new needs.

5.2.3 Acquisition of Knowledge

The present research findings indicated that the teacher-educators' acquisition of knowledge in the transition to distance-teaching was conducted without any prior intention and in an unorganised fashion. They acquired their knowledge from three main sources: on their own initiative, from the college and from bodies outside the college. A special Centre for Digital Learning (CDL) was established in the college, to provide a pedagogic and technical response for teacher-educators at the planning and teaching stages and enable the teacher-educators to gain knowledge in this area.

The teacher-educators increased their knowledge concerning the integration of the computer in teaching and learning from bodies outside the college. However, since these studies were not always applicable to the teachers' specific needs their contribution to their new abilities was deficient. The findings of Flick & Bell (2000) also note the fact that very few teachers are able to integrate technology in teaching without seeing examples of such teaching, in order to experience and imitate it. This significant finding regarding insufficient or inappropriate training provided to teachers during the transition to distance-teaching is partially supported by a study regarding school teachers (Nir & Bogler, 2008) that revealed that programmes for professional

development that are transmitted as part of the teachers' in-service training are effective when they are long-term, focused on the pupils' learning and connected appropriately with the learning programme.

Teachers think it is important that their professional development should be linked properly and suitably to the needs of their classroom teaching so that they can influence the directions in which their professional competency develops in accordance with their needs and expectations in school.

The study by Lu & Mile (2002) claimed that teachers need suitable training, after which they can be expected to change their use of traditional teaching methods and combine them with computer-integrated methods. The inappropriateness of the training that the teacher-educator received in bodies outside the college did not provide a response for the teacher-educator's needs. This conclusion is reinforced by the findings of Loveless (2008) that teacher-educators are the key to implementation of change, and they are required to undergo a development process in order to transform them from teacher-educators to on-line teachers. This significant transition, necessitating a complex of components, is perceived by the system as a challenge including 'retooling' of the teacher-educator, achieved through specialist training that enables the teacher-educator to become familiar with technological tools, altering the teacher-educator's teaching paradigm, operative style and role perception. However most teacher-educators in this study were veteran teachers with much experience, so that each of them had a high level of professional knowledge as defined by Shulman (1986a; 1987), including subject-matter knowledge, knowledge of other content, knowledge relating to context (curriculum), knowledge of educational aims and knowledge of learners. Only one teacher-educator came from studies in an academic discipline, so that as Goodlad (1990) noted, she began to teach at the college with no prior teaching experience. She therefore had deficient knowledge in two knowledge components: general pedagogical knowledge and pedagogical content knowledge (Shulman, 1986a; 1987).

Research literature indicates additional types of knowledge, in which the teachers felt they were at the inception of their professional career, since they completely lacked knowledge and experience in the area of integration of the computer in general and the subject of distance-teaching in particular. Craft knowledge (professional skills and specialisation) and practical knowledge that constitutes a combination of the previous types of knowledge that the teacher-educator processes on the basis of experience acquired over years of practical work (Elbaz, 1983). This knowledge develops from complete practical ignorance into practical teaching wisdom (Wilson & Daviss, 1994), as a result of (reflective) thinking and increased knowledge of self including the teachers' heightened awareness of their own values and principles, their educational perception and educational goals, their teaching style, personal characteristics and strengths and weaknesses when teaching. The teachers develop their self knowledge through analysis of their actions, reflecting on their work and evaluating the effect of their teaching. In order to improve their self knowledge, teachers need to continually receive feedback regarding their pupils' consideration of their teaching and to know what the pupils understood. In response to this feedback they need to reprocess their teaching programmes and improve their teaching (Grossman, 1995).

A significant finding is the fact that at the inception of their distance-teaching careers, teachers found it difficult to achieve a balance between knowledge, pedagogy and computerisation. According to the research literature this difficulty in gauging the correct amounts for the interaction between these substantive areas makes it difficult for teachers to employ pedagogic flexibility when applying computerised tools to teaching (Mishra and Koehler, 2006; Koehler and Mishra, 2008; Koehler and Mishra, 2009).

Veteran teacher-educators became novices in areas defined by Shulman (1986a, 1986b) as theoretical knowledge, cases' knowledge and strategic knowledge. It appears that if the teacher-educator had a more detailed reservoir of knowledge and a larger reservoir of behaviours, the teacher-educator could be expected to have greater expertise and would teach with greater flexibility and more effectively (McDaniel, 1982). Zeichner & Liston

(1990) also noted that a teacher-educator's professional knowledge should focus on four aspects: subject matter, the learners' thinking and comprehension, practical teaching strategies and the social milieu of teaching.

Fennema & Loef Franke (1992) found that expert teachers have effective thinking and use different channels for solution in comparison to novice teachers. Their knowledge is more integrated, organised and accessible than the knowledge of novices. Since this better organised knowledge is stored more efficiently, the experts find it easier to access this knowledge (by remembering it) and since this knowledge is more accessible, acquisition of new knowledge and problem-solving are facilitated. The development model of Dreyfus & Dreyfus, (1986) is useful for the analysis of the functioning of novice teachers. This model suggests five stages of a teacher's development from the novice stage to the stage of expertise. At the first stage all teachers without exception functioned as novices in the teaching area or with regard to their technological knowledge and ability, performing teaching rules in an inflexible manner. At the second stage they began to develop slightly and performed the rules in a slightly more flexible manner. Only a few of them reached the stage of the effective performer, able to produce programmes. None of the teachers had yet arrived at the highest two stages: (1) skilled performer with much experience who is able to understand what are the most important factors in a given situation and make decision in a flexible manner on the foundation of the factors in a given situation; and (2) the expert who is able to act intuitively, without relying on the rules and without repeated deliberation concerning his/her actions, in their transition to distance-teaching.

Given their development according to the above-mentioned stages, it seems that at the time of their transition to distance-teaching, the teacher-educators in the present research were actually at the 'novice' stage. This finding is supported by the study of Shiloni (1991) who found differences between novice and expert teachers in four different dimensions: knowledge base, knowledge organisation, knowledge representations and problem-solving strategies. Although the teachers worked with technology, due to the fact that they were involved in a transition to distance-teaching, the teachers functioned like

novices and as Glaser (1990) noted technology can offer no prescription to turn novice teachers into experts.

In conclusion, the teacher-educators' entry into distance-teaching altered one of the characteristics of their status. Although they were veteran teachers with several years experience teaching in colleges and some of them also had years of experience teaching in schools and had substantial knowledge of different kinds, on the other hand they were still 'trainees' in distance learning and this had implications for their capabilities and their perceptions that influenced the performance of their new teaching style. Additionally they received sparse training that was in the main unsuitable for their needs. This insufficient training meant that the teacher-educators found it difficult to establish the correct balance between knowledge, pedagogy and computerisation and to act with pedagogic flexibility when implementing computerisation in teaching.

5.2.4 Professional Change and Development

The teacher-educators who transferred to distance-teaching felt and understood that they were undergoing a change; consequently, at least at the beginning of this new career they were willing to 'pay the price' for the change that embodied several negative components including regression, anxiety, passing and the struggle to accomplish the transfer characterised by a lack of confidence, lack of clarity, 'getting lost' and exposure to excess information (Schon,1971; Sarason, 1982; Fullan,2001; Fuchs,1998). However Jackson (1992) drew a distinction between professional change and professional development of teachers. In his opinion each teacher-educator alters over time (as does any other person) but not every change is a change that testifies to development and certainly not professional development. Certain specific methods can be considered to assist teachers in their professional development (Jackson, 1992).

1. The 'Way of Know-how': guidance and counselling to improve teaching methods. The college established the Centre for Digital Learning and

used it to provide pedagogic and technical support for the teacher-educators.

2. The 'Way of Independence': improvement of work conditions and enlarging the teacher-educators' independence in areas relating to their work. The college and bodies outside the college that support teacher-training in Israel provide financial rewards, at least at the initial stage, granting the academic freedom that each lecturer in the academic college has to the teacher-educators.
3. The 'Way of Role accommodation': relief from psychological pressure stemming from the difficult demands imposed on teaching work that caused many of the teachers to become frustrated and sense that no solution was found.
4. Deepening the consideration beyond that which is normally given and broadening horizons. At this stage each teacher acted independently and so they reached a new position in their professional development.

Since the college wanted to achieve 'successes' and to present its image as a technology-integrated college, the change that took place was rapid and incorporated many factors. This contradicts the view of Wickstrom (2003) that change should be introduced gradually and should not affect many factors simultaneously. And according to Salomon (2000) long-term influences that were created gradually and were largely unfelt, were more stable and durable against attempts to alter them than short-term influences.

Each of the teacher-educators entered this field at different times, most of them did so without previous planning, and abruptly, so that they had little time to organise and to construct the course. There were cases in which the course was constructed during the semester's work. This process runs contrary to previous research findings (Barker & Dickson, 1994; Bonk & Zhang, 2006; Hiltz & Goldman, 2005) which showed initial preparations should preferably be conducted at the college level, in coordination and collaboration with all role participants. Study of the research literature indicates two characteristics that were missing in the distance teachers' preparations in the present research:

1. A financial infrastructure, sources of investment, a different language and culture (Lynch, 2002).
2. Allocation of time for the on-line course preparation, at least a semester beforehand. This length of time would enable teachers to become acquainted with their colleagues in the staff, to define their roles and responsibilities (Collins et al., 2002).

To conclude: hasty introduction of the change indicated the need for a professional change but did not give the teacher-educators time to reach full professional development before commencing their work in practice.

5.2.5 Factors that Support or Block the Penetration of Change

The theory of Strike & Posner (1992) relates to change in social discourse. It focuses on 4 conditions that facilitate successful change of perceptions of its meanings and a transition from existing beliefs to new beliefs. The necessary conditions for a successful conceptual change are:

1. Lack of satisfaction regarding existing beliefs, where these beliefs are not sufficiently functional – this phenomenon and feeling were felt by the teacher-educators who wanted and looked for change.
2. Appearance of a new intelligible notion that seems to be logical and encourages the individual to investigate it and consider accepting it instead of a defectively functioning belief. The teacher-educators were enthusiastic about the integration of the computer in their teaching and the advantages of distance-teaching that is independent of time and location.
3. Plausibility: the new perception should be able to compete against the existing perception, in other words it should have the potential to solve problems relating to other established beliefs – the new perception provided a response to problems and needs that were on the 'agenda' of the teacher-educators and the college.
4. Fruitfulness: the new perception must be a 'productive tool of thought' and offer new directions for research.

These conditions are part of the complex environmental setting, which contains a network of entities that influence the individual's perceptions and willingness to change them – although some of these conditions existed at the college in which the research was conducted not all the teachers had yet learned how to exploit it.

The reason that not all of the above-mentioned conditions had been achieved is explained by Fullan (2001), who indicates that in case of implementation of a significant change, problems appear regarding clarity, and there is an obvious linkage between the strength of these problems and the complexity of the implementation. The central problem that stems from lack of clarity is that those applying the change reveal that they did not understand the meaning of the change when they put it into practice.

Many researchers (Fullan, 2001; Eraut, 1995; Hall & Hord, 1987) explain that the penetration of change processes involves the teacher's thinking and actions and self-understanding, the system's understanding of the teacher's world and the teacher's professional development. The present research findings indicated that not all these above-mentioned conditions had been met so that the change process had not yet been completed.

Another direction of interpretation can be developed by relying on the work of Rutherford & Grana (1995) who found that academic staff may have different fears regarding the new technologies, e.g. fear of change, trepidation regarding the need to invest time to learn the new technologies, fear that they lack suitable skills to employ the technologies and fear of failure. At the initial stage of transition to distance-teaching these fears were not obvious, on the contrary, the teachers were firm in their intent to overcome any obstacles especially those teachers, who had internal motives for the transition to distance-teaching.

An additional blocking factor that delayed the rapid trace-free transition from traditional teaching to distance-teaching stemmed from technological difficulties, which teachers encounter, demonstrated in previous studies (OTA Report, 1995; Cuban, 1999) as a product of the loose connection between teachers and the technology. While yet another factor that made the transition to the new teaching style difficult was the significant isolation of the teacher,

working independently without professional support in the specific disciplinary field (Hixon, 2008).

To conclude: a set of supportive factors assisted and accelerated the teacher-educators' transition from traditional teaching to distance-teaching but there were also blocking factors that delayed or complicated the transition and the implementation of change.

5.2.6 Section Summary

No difference was found between the teacher-educators with regard to their motivation for change. All of them had both intrinsic and extrinsic motives. Although most of the teacher-educators were trained for teaching they were now novices as distance teachers. In the change process supportive and delaying factors appeared and examination of the transition process showed that the teacher-educators had not gone through all the stages of change and had not achieved complete implementation of the change.

5.3 How did the Teacher-educators harness Technology to organise Information?

The research findings indicate two extreme manners used by the teacher-educators to harness technology in order to increase/minimise data representations. The conservative style characterised by few data representations, few layers of information and data links, characterised teachers with an interactive or organisational mode in contrast to the creative style, which was characterised by a multiplicity of data representations (representation channels), ample levels of information and links to information used by teachers categorised in the representation and holistic modes.

Gomez et al. (2008) indicated that it is important to identify suitable technological tools for each discipline and a different use is made of these tools by each discipline. In the present research different teaching perceptions were found in the different disciplines regarding organisation of information in general and on the subject of the use of data representations in particular. The

representation teaching mode guided the learners through a tour, as for example in a 'museum' to discover and choose what was most suitable from an abundance of possibilities. In the spirit of Marbito (2005) they combined different complementary types of data sources in their course sites and did not limit it to uniform textual materials.

The teacher-educator, who used the representation mode, taught a course with hundreds of participants. She used virtual tools in her forum to organise the data, employing a 'mass model' in which she used a discussion group as a tool to transmit information from the instructor to a large group of learners (Hiltz, 1988).

Those teacher-educators who used the holistic mode used similar tools to the representation mode but in addition they employed a variety of data representations that contributed to the broadening and variation of interactive teacher-student(s) channels. While the representation mode uploaded all the materials from the start onto the site, a style that made the teachers adopt a fixed and focused organisation of teaching, the holistic mode added, altered and widened the materials and they perceived their teaching as open and flexible.

In contrast, although teacher-educators who used the organisational mode tried to broaden the variety of data representation they arrested the process the moment that there was any technological difficulty and did not perceive it as part of their role to provide a response according to 'digital literacy' (Lanham, 1995; Pool, 1997; Inoue, Naito & Koshizuka, 1997; Gilster, 1997). They prevented themselves from introducing new technologies because they lacked of technological literacy.

This teacher-educators who used the interactive and organisational mode, chose not to integrate the use of additional tools or computer applications apart from e-mail and the forum, in the virtual environment that they guided. This meant that they prevented their students from presenting their knowledge in different ways (Ripley, 2002). On the other hand, teaching methods such as speaking and listening which had been central to their traditional teaching were not expressed and they used technological replacements instead. They

understood that their limited usage of data representations constituted a disadvantage and difficulty, since in the transition to virtual teaching they actually lost other channels for the transmission of information. An explanation for this behaviour was given by Kalmbach (1994) who claimed that it is difficult to develop multi-media interactive programmes for higher education because of the fact that the experts, teachers and those who publish articles who are knowledgeable in the subject-matter are unable to programme the software, while many programmers are not sufficiently knowledgeable with regard to theories and teaching methods.

5.3.1 The Creation of a new Teaching and Learning Style as a result of the use of Internet Links and Documentation

Teacher-educators who used the representation and holistic modes chose to use a wide range of links to sites and other files through Hypertext; they exploited this form of multi-dimensional and multi-directional writing, because it enabled them to present information in an associative manner and not in a linear fashion, as is usually done in writing. In this way they enabled the learners to flow with the information according to their personal preferences and not according to the writer's preferences. Using Hypertext they allowed the learners to learn in all manners and to broaden or shorten the learning. These findings are in line with the findings of Killion (2002).

Rotem & Peled (2008) claimed that the manner in which digital text is used is different from the use of ordinary text. Teachers from both the above-mentioned modes identified the advantages of Internet language as something completely different from regular written typed language. They strove to use it for another type of teaching and learning.

Teacher-educators who used the holistic mode taught disciplines which had a rich use of texts, so that by using Hypertext they constructed an Intertextuality of a different kind from that which existed at the time of its growth, as was noted by Allen (2000).

An additional interpretation for this process was given by the School of Literature, Communication & Culture (2006), which indicated that interactive writing is an area that demands the formulation of new rules for the concept 'writing' and specialisation founded on different contents. The role of the reader on the Internet varies substantially and becomes an active factor that affects the creative process itself. The Internet allows the reader to become a 'reactive-reader' or 'critic-reviewer-reader', and the fact that the reader's comments can be distributed widens the meaning of the concept 'reading'. Thus, as Spiro et al. (2000) explains, the use of Hypertext enables non-linear learning as does the language in which it is written, the content and different aspects of the presentation, which all facilitate the imprinting of the content among the learners and encourage this interaction.

Since teachers who used the holistic mode strongly supported collaborative learning, they succeeded in promoting this cooperation through the publication of digital text, providing immediate accessibility to this text. In learning contexts this method/ is used in instructor-learner pedagogic dialogues, in publication of learning products, in regular correction and updating at any moment alongside continual sharing by active and passive partners in the learning process, as noted by Rotem & Peled (2008). Using links and Internet writing and reading abilities a new teaching and learning mode was formed that developed a variety of learning options for the teacher-educators and students and exposure to extensive information and materials.

5.3.2 Choosing Appropriate Information for each Learner

Teacher-educators who used the holistic and representation modes, exploited the possibility that information could flow from everywhere to everywhere and that it was accessible to everyone, everywhere and at any time. Thus they helped the learners to receive information and the learners could, by themselves or with the teachers' assistance, transform this information into knowledge (Brooks & Brooks, 1993). The teacher-educators exploited the advantages and abilities of distance learning that enabled them to meet with other educators from all over the world, for example in courses and seminars

and allowed them several options for 'just-in-time' learning (Killion, 2002). The computerised environment enabled each learner to learn according to areas of interest that they chose, even if there were only a small number of learners wanting to study a particular subject (Dede, 1990).

Teacher-educators who used the holistic and representation modes discerned that in distance learning, in comparison to traditional learning there is more self-direction with reinforcement from the contents and less reinforcement from the teachers. They therefore created interactive contents for the programme that would increase the learners' motivation. Using course contents planning they tried to respond to different learning styles of the learners/students a strategy indicated by various previous studies (Moore & Kearsley, 1996; Anderson & Garrison, 1998; Mabrito, 2005). In order to ensure that their courses would be invigorating and promote effective interaction with the learning materials they made sure that it would be easy to navigate through and search the course contents (LaMonica, 2001). They organised the learning space in the course so that already, at a glance, students would find it functional, clear and lucid (Mabrito, 2005). Thus, all the content areas and categories of the course were easily identifiable and accessible for students in line with the usability laws defined by Nielsen (2000).

5.3.3 Preparing the Students for Web 2

Teacher-educators who used the holistic and representation mode spread out the information before the students and gave them access to data sources and thus prepared this generation of learners for the age of Web 2 technology in which they would need not only to find the data but also to identify the different sources of data and clearly distinguish between them, as was suggested by the survey of Lombardozzi (2009).

Despite the rich abundance offered by the teachers to their students with the help of technology-assisted data organisation, the research literature (Cuban, Kirkpatrick & Peck, 2001; Bonk, Wisher & Lee, 2003) that examined the reasons for the few successes in assimilating technology in teaching in recent

years, still shows that the main problems relating to on-line learning stem from the students' and teachers' difficulties in effective use of computerised learning. The course and learning materials available on the net have not been specially developed for on-line learning, they do not make the most intelligent use of the technological environment and are not designed in a way that encourages learning (Shemla & Nachmias, 2006).

An additional reason for the failure of virtual courses is that students find it difficult to cope with reading digital and Hypemedia texts (Spencer, 2006). The research findings do not indicate that the teachers found this issue problematic so it seems possible to estimate that the teachers who used the holistic and representation modes knew how to use the on-line teaching tools effectively.

5.3.4 Efficient Work through Data Organisation

The central focus of the organisational mode is the organisation and efficient operation of teaching and learning. These teachers therefore used a 'headers' discourse' (Margalit, 2004) in e-mail and on the forum which was explicit, clear, consecutive, effective, short, intelligent and economic, enabling learners to learn from it about the substance of the discourse even before they opened the messages. Using their authority as teachers, they stipulated that the participants in the discussion should comply with writing rules that facilitated effective learning. This technique made it easier for students participating in the discussion to use rapid skimming reading to identify the substance of the discourse and the messages or letters that were relevant for them. They developed the ability to use the headings and derive the information from them by reading them, and were able to send the information/ through independent creation of headings.

5.3.5 Concern regarding Excess Information

Although teacher-educators who used the interactive mode organised their teaching to be open and flexible, their minimal use of data representations almost completely denied them the space and possibilities to organise the data in a way that would contribute to presentation in the virtual space. Additionally they wanted to maintain their existence as charismatic teachers and the fear that they might lose this perhaps led them to limit the information that they presented to learners. This perception relies on the research published by Baraniuk (2008).

Teacher-educators who employed the interactive mode feared that exposure of the knowledge meant that it would be expropriated from their possession and creating a 'frightening' situation, in which the students were liable to use it as if it were their own, for example reading in their own preferred order, even performing actions from the end to the beginning. In the virtual environment in which information is available in many different structures 'the unbearable easiness' of browsing, searching, cutting out, copying and pasting certainly enables far more freedom of choice in data management. These teachers perhaps feared the definition of the information boundaries, sensing that the student might 'drown' in the 'ocean' of information, and felt they should sieve the information and ascertain the boundaries of the knowledge, as opposed to the freedom of the 'almost infinite' search options.

5.3.6 The Contribution of Multimedia to Teaching and Learning

Teacher-educators using the holistic and representation modes employed presentations as an a-synchronic communication means and as a tool to represent data since it is possible to integrate text, graphics, sounds, voices and a wealth of special effects (Lynch, 2002) and as a tool through which they could help learners to present their knowledge in different ways (Gomez et al., 2008). A ritual that was very helpful for teachers employing the holistic mode was to promote 'peer learning' and this allowed the students to practice the

subject through data representation and to pass on their ideas, contents and any other material in a concentrated and clear manner to other participants.

Both, the holistic and representation modes chose to integrate presentations but they did so in two different manners (Blanchard, Lewis, Crossman, 1995; Lachs and William, 1998; Lynch, 2002). The first option, observing or using a multimedia (ready-to-use) presentation prepared by others was used by teacher-educators categorised in both modes: holistic and representation. In the holistic mode the presentation was prepared by the teacher-educator or the students; in the representation mode only by the teacher-educator. The teachers, teaching natural sciences and statistics, who used the representation mode, integrated multimedia in order to provide a living representation of the subject. This influenced the way in which the course was managed so that it was able to provide an option for self-assistance and included tools for self-assessment (University of Texas, 2004).

The second option was independent production of presentations construct your own this option was only found among the teacher-educators who employed the holistic mode who guided learners to use collaborative learning, where the students contributed their own knowledge for the shared development of learning. In this situation the construction of a multimedia presentation served as a means of communication with others and helped the learner to create a network of meanings. The multimedia served as a tool to enhance thinking and for the construction of learning, and relied on the constructivist approach to education. Salomon (2000) claimed that good learning is produced through the learner's own construction of learning and the construction of a multimedia presentation is a unique way to enable this process. The teachers related to the presentation as a 'visual map' that enabled the learners to produce a product that expressed their understandings instead of reiterating in different manners the knowledge that others (usually teachers) presented to them. Lachs & William (1998) saw this as 'empowerment of the learner'. The ability to represent information in a sweeping, multi-directional manner using links to

different issues, enabled distinctions to be made between basic information and deeper more broadening data (Riel, 1994).

Thanks to the 'presentation' which is one of the many helpful computer technological devices, it is possible to direct efforts to meta-cognitive development, with cognitive shaping and construction (Jacobson, 1980; Pea, 1993; Papert, 1980) . The teachers guided the learners to take part in 'an intellectual partnership' (Salomon, 1996) and to learn as a social, interpersonal process. This process takes place through collaborative work in a partnership/team, where the emphasis is moved from the centrality of the teacher-educator and formal achievements to learning based on processes and interactivity that occurs between members of a community, and between them and the computer (Pea, 1993; Mercer, 1993; Kozma, 1994). Using the presentation the learners developed their awareness regarding the recipients. Knowing that the presentation would have recipients increased the producers' responsibility both for the choice of area of the knowledge and its accuracy, its trustworthiness and validity – and also for the manner in which it was presented. This process meant that they had to acquire an awareness of others. So that the learner could reflect on the learning and production processes, and their accuracy, trustworthiness, validity and representation methods, they needed to conduct an interaction with an external recipient/observer, through which they could identify actions, feelings and thoughts that occurred during the learning process (Imel, 1992).

Teachers who used the representation mode employed an additional technology that was available for them. They suggested that the students interact with learning materials through the use of on-line tests, key questions presented to the learners which they were asked to answer at the end of each learning unit and using visual multimedia illustrations to present the learning materials (Goldstein, 2001). In this way they helped them to learn details, names and concepts that needed to be memorised or exercised repeatedly.

Thanks to the use of Internet software (Eitan Education on-line site, 2003a), the teacher-educator in the multiple participant course created a sort of 'individual explanation' for each learner. She exploited the potential of the software that supported simultaneous transmission of recordings including vocal material, pictures, video, texts and slides to an unlimited number of end participants. The variety of representations enabled her to achieve abstraction and different levels of explanation, and offered possibilities for revision and exercises that could not be achieved in traditional teaching, as was explained in the literature (Wilson & Ryder, 1988; Anderson & Garrison, 1998; Goldstein, 2001; Calandra, Barron & Thompson-Sellers, 2008).

5.3.7 Section Summary

The teacher-educators saw the power and strength of data organisation through links and Internet writing. The options that they used or blocked divided the teacher-educators so that they employed one of two contrasting approaches to the integration of technology in their organisation of the data. The strategy employed by each mode stemmed from the character of the discipline that the teachers in that mode taught, the perception of their position as teachers, the type of interaction that they conducted with the students, and between the students, whether or not the teacher-educator was digitally-literate or a computer user.

The teacher-educators who taught literacy and used the interactive mode, and those who taught education and used the organisational mode, employed very few data representations. The reasons for this stemmed from their fear that they might lose their authority and lack of technological literacy and a search for greater efficiency in their work. In contrast the teacher-educators who taught natural sciences and statistics and used the representation mode and those who taught education and literature and used the holistic mode exploited the technological potential to organise data and used a wide range of data representations.

Data organisation is a new teaching skill required by teacher-educators, and in each of the different modes the teacher-educators channelled this skill to satisfy different needs of the teachers and students. The advantages of the computer were used for non-linear writing and reading, enrichment of data sources and organisation of teaching and learning.

5.4 How did the Teacher-educators harness Technology for the Organisation and Management of Distance-teaching?

The research findings indicated a division between the different teaching modes when relating to the subject of organisation and management of teaching. The teacher-educations that used the interactive and holistic modes perceived the organisation of teaching as open and flexible in contrast to teachers who used the organisational and representation modes who perceived the organisation of teaching as more focused and fixed.

The greatest contrast was found between teachers who taught education disciplines and used the organisational mode (who uploaded the materials onto the site before the course began, used few technological tools and provided a summative assessment for individual tasks) and the teachers who used the holistic mode (who continually changed and updated the learning materials on their site). The latter group integrated a wide variety of technological tools in the different virtual environments providing understanding for the learner with a teaching style that was focused on the learner. They provided varied tasks and both formative and summative assessments for each learner. The entire weave of their activities was reinforced by strengthening the interactions between the learners and between themselves and each student.

In the representation mode, learning materials were determined and uploaded before the beginning of the course and the students' tasks were uniform. In contrast, in the interactive mode there was little use of technological tools but a forum and e-mail were used intensively, allowing the teachers to conduct

intensive interaction with each student so that the teaching became learner-focused. Tasks were provided with a possibility of repetitive attempts and both formative and summative assessments. The use of formative assessment constituted a central axis in their perception of their teaching.

5.4.1 Teacher-focused Teaching in contrast to Learner-focused Teaching

Teacher-educators who used the organisational mode continued to use traditional methods of teaching; meaning that the teaching was teacher-focused. This characteristic is identified by a long list of teacher-focused teaching components mentioned by the relevant literature. The teachers perceived their main role as the transmission of knowledge (Lindblom-Ylänne et al., 2006). They determined the material to be transmitted in each lesson and ensured the organisation and sequence of this material (Withall, 1985). If, in traditional teaching they tended to speak more than the pupils when teaching, then in distance-teaching they were the sole providers of the learning materials; and they determined the use of classroom time and the pace of the teaching (Cuban, 1984). They maintained the image of the teacher-educator as an 'executive' responsible for the management and organisation, the outputs and discipline.

The learning environment of this teaching culture was characterised by tasks set for the learner, which were organised by academic subject and in accordance with skills acquired by the learner. These tasks were tasks necessitating memorisation of material and practice of skills. The tasks were usually closed and allowed very little adaptation of the task to the areas of interest expressed by the learners or their academic level (Cooper et al., 1996). The content was prepared and presented to the learner in its finished form and the learner simply needed to receive and absorb the studied material in his mind, often by memorisation. The student was able to understand and remember concepts and ideas without needing previous problem-solving experience and without needing to discover all the concepts and principles independently in order to understand them and use them reasonably (Ausubel, 1968). In contrast in the other three teaching modes found in this study, the

teacher-educators who used the representation, interactive and holistic modes used learner-focused styles.

One of the characteristics indicating flexibility in learning is that the learner is at the centre and not the teacher. This appears in the lists of characteristics of flexible learning mentioned in the literature (Meyers & Jones, 1993; Motschnig-Pitrik & Holzinger, 2002; Gudmundsson & Matthiasdottir 2004). Learner-focused teaching is based on the learner's active learning and active participation in the learning process (Withall, 1985; Rennie, 2007). The representation mode achieved this through the use of multiple data representations offered by the teachers, which enable students to choose what is suitable for them and practice exercises relating to the learning material. The interactive mode achieved this through formative assessment of many written drafts, which were inspected by the teachers, while the level of writing and amount of investment in exercises remained the responsibility of the learner. In the holistic mode two characteristics were found that were similar to those noted in the representation and interactive modes and in addition the teachers allowed the learner to discover new and other materials, in addition to opportunities to learn in a manner that was not linear or fixed and thus they transferred the responsibility and the focus of the learning to the learner.

In the interactive and holistic teaching modes, an additional aspect was found: teachers who saw the learner at the centre saw their teaching as assistance, promoting the students' learning and knowledge construction, or supporting the students' conceptual change. The teacher-educator enabled the students to participate significantly in decisions concerning the teaching and learning in the class and at home and in the assessment of students as learners (Cuban, 1984; 1990; Samuelowicz & Bain, 1992; Prosser et al, 1994; Trigwell & Prosser, 1996; Biggs, 1999; Prosser & Trigwell, 1999; Vermunt & Verloop, 1999; Samuelowicz & Bain, 2001; Kember & Kwan, 2002; Lindblom-Ylänne et al 2006; Delialioglu & Yildirim 2007).

In addition, those who employed the holistic mode supported the approach of Bruner (1960) who recommended learning through discovery or research where very little of the learning material is presented to the learner and the learner has to discover the content alone. The holistic and interactive modes were characterised by an open and flexible organisation of teaching and exploited the 'waiting time' needed to receive responses on the forum, to create opportunities for reflective and purposeful learning, enabling ideas to be raised on a specific subject and answers to be received regarding these ideas. They created opportunities for reflection about ideas enabling writers to express their own views and review those of their peers.

This reflection was perceived as a mental dialogue in which the individual examined the information received from others or from other sources regarding themselves. Many research findings support the encouragement of reflective process during learning to enable the presentation of arguments in an open and democratic manner (Treacy et al., 2002; Lapadat, 2002).

Additionally, teacher-educators categorised in the holistic mode enabled peer learning and the construction of knowledge. This perception of teaching is supported by constructivist theories of education characterised by collaborative learning (Turner & Dipinto, 1992; Meyers & Jones 1993; Jacobson & Spiro, 1995; Relan & Gillani 1997; Motschnig-Pitrik and Holzinger, 2002; Gudmundsson & Matthiasdottir, 2004; Lohnes & Kinzer, 2007; Vovides et al., 2007).

These teachers frequently acted behind the scenes. The explanation for this strategy can be found in the work of Hult et al. (2005) who claimed that the teacher-educator in a computerised course cannot rely solely on constructivism and leave the entire dynamics to the learners, because independent dynamics do not exist, unless they are purposefully directed by the teacher-educator.

The findings of the present research are in line with findings by Cavin (2007) indicating that novice teachers, who only respect student-centred teaching approaches, succeed in integrating data technology more smoothly than those who prefer teacher-centred teaching.

To summarise: teacher-centred teaching and student-centred teaching approaches became significant and were applied in different ways in the Internet environment, in which there were a variety of communication channels, data representations and interactive possibilities. Further interpretation and explanation regarding the Learners' Learning Styles and Learner Characteristics are presented in Appendix IVA.

5.4.2 Constructivist Learning

The research findings indicated that the different teaching modes relate differently to the principle that students should be led towards constructivist learning (Driver et al., 1994; Hoover, 1996; Richardson, 1997).

Teacher-educators who taught according to the representation mode mainly stress individual learning by the students and so they guided them to constructivist learning.

Teacher-educators who used the organisational mode stated their intention to guide students to use constructivist learning, but in practice they did not offer sufficient opportunities to advance this process and in fact did the opposite, they provided uniform tasks which did not create any need for peer learning or social familiarity between the learners.

In contrast the teacher-educators who used the interactive and holistic modes tried to guide students towards constructivist learning on the basis of the principles determined by Brooks & Brooks (1993). They saw the forum as an important teaching and learning resource and devoted an enormous amount of time and thought to the way in which it would be possible to promote the pedagogic process and examined the extent of their own presence and involvement in the forum.

As noted by Anderson et al. (2001) and Garrison and Anderson, (2004) one of the central components of a teaching presence is the encouragement of debate through which they maintain the motivation and involvement of all the participants. At this juncture in leading the process the teacher-educators using the interactive mode halted, since they tried to maintain their charisma and

stopped any development of processes that would encourage constructivist learning. La LaMonica (2001) listed characteristics that the teacher-educator should use in order to create a constructivist climate when employing the on-line learning strategy. Table 8 below explains the contradiction between the declarations of teacher-educators using the interactive mode and their practice with regard to the employment of constructivist learning according to the characteristics listed by LaMonica.

Table 8:
Explaining why Teacher-educators using the Interactive Mode blocked the Use of Constructivist Learning

Characteristics of Constructivist Learning according to LaMonica (2001)	Appropriate and Deficient Features of the Interactive Mode's practice in relation to Constructivist Learning
Encouragement of learners' autonomy and initiative and creation of an active sharing atmosphere in the discussion group or through electronic mail.	In some cases there was little initiative expressed by students since the materials were predetermined by the teacher-educators. In addition, some of the communications between the teacher and the students were conducted through e-mail or in the personal file of the student and were not exposed to the other students.
Access to varied sources and use of different types of information, also interactive links as part of the learning materials, and additionally multifarious representation of learning materials.	Was not enabled. The materials were provided by the teacher and included the links to learning material. There was limited use of multifarious representation of learning materials since they only used traditional means of reading and writing.
Encouraging learners to create a dialogue with the teacher and with colleagues in the discussion group to enable social relations to form with regard to the studied contents.	Although there was a dialogue between the teacher and the student and the tasks were in part given to all the groups, personal formative assessment was given to each learner. In addition the teacher-educators stated that it was not part of their role to organise the social interaction of students and so they did not encourage or create a social environment to form social contacts with regard to the studied contents.
Providing an opportunity for learners to relate to their colleagues' questions without interference by the teacher-educator.	Almost entirely non-existent. The teacher-educators were very charismatic and were afraid that they would lose their status as

Characteristics of Constructivist Learning according to LaMonica (2001)	Appropriate and Deficient Features of the Interactive Mode's practice in relation to Constructivist Learning
	teacher-educators so that they continually entered the site and reacted within the group discussions as part of their perception of maintenance of their status.
Providing frequent guidance and feedback.	Did exist
Clear drafting at a high cognitive level. The learner should know ahead of time what are the tasks and what is the learning timetable.	Did exist

There is a gap between the declarations of teacher-educators using the interactive mode and their implementation with regard to their actual guidance of students to constructivist learning. This is principally expressed in the teacher's centralisation that prevents the development of parallel channels and the provision of 'power' to the students and their peers to lead the learning. These teacher-educators also fail to invest in or support the social relations between students.

5.4.3 Formative and Summative Assessment in Contrast to Summative Assessment Alone

The research findings demonstrated that each teaching mode harnessed technology in a different manner in order to provide assessment. Those who used the organisational mode only provided summative assessment, while the other three modes, holistic, interactive and representation enabled the students to receive summative assessment from the teacher-educators and formative assessment from their peer-students, teacher-educators and on-line tests.

Teacher-educators who used the organisational mode maintained the traditional model of assessment except for the manner of presentation of tasks and their publication on the forum before their peers in the course. This work method was similar to that found by Zakrewski & Bull (1998). They also found that computerised teaching used traditional assessment constructed on the basis of a few short questions, each of which had a short correct answer. Additional support for this interpretation is given by Elliot (2008) who claimed

that computerised assessment has assimilated exactly the same characteristics as traditional assessment and, in practice, from a perceptual viewpoint it belongs to the Assessment 1.0 generation. It is formal, inflexible, detached from the learners' experiences and detached from the learning methods and skills that the learners have assimilated in the Internet era. This work method has developed for two reasons: teacher-focused teaching and a desire that the teacher-educator's work should be effective, so that each task is inspected by once only the teacher-educator and this is the basis for the assessment.

In contrast those who chose the other three modes also used formative assessment, including the employment of technological skills; however, each of these modes harnessed technology in a different way in order to conduct the formative assessment.

Teacher-educators who used the representation mode allowed students to perform any task in a personal manner several times and when the students made mistakes they were able to correct it again and again. The learning was focused on the learner and the learning disciplines that they studied. Statistics and natural sciences disciplines required repeated exercises to absorb multiple small details and so the teacher-educators used different representation to encourage the students to perform additional exercises without creating boredom. These findings are supported by the literature (Thron, 2001; Lynch, 2002; Killion, 2002) where it is claimed that computerised teaching creates meaningful opportunities with different requirements in comparison to the traditional model. The technology provides a good level of effectiveness, through formative assessment in real-time.

Teacher-educators who used the representation mode employed technology to provide a wide variety of options for the performance of assessment for the students. As was noted by Wang et al. (2004) computerised assessment systems allowed teacher-educators to develop tests by themselves in accordance with their teaching goals by using existing reservoirs of details, catalogued according to different characteristics. A further additional use of Internet-based applications related to the reportage of assessment details that allowed the teacher-educators to obtain a categorised analysis of the students'

marks close to the completion of the test according to their requests. These reports, which the teacher-educators could easily access, enabled them to adapt the next stage of the teaching according to the students' achievements. According to He & Tymms (2005), the computerised assessment tools served as diagnostic tools that reinforced the teacher-educators' assessment abilities and provided significant assistance to improve students' learning processes and achievements. These findings are also supported by the recently published study by Kopkalli-Yavuz & Mutlu, (2009) which showed that there is a connection between the frequency of on-line support and the student's achievements. More frequent interaction of the student with the computerised support system enhances the student's quality of learning and course achievements.

Teacher-educators who used the representation mode performed 'self assessment' as recommended by Goldstein (2001). This assessment was performed through interactive tests, which provided the learner with immediate feedback on the level of understanding of her understand, and referred the learner, if necessary, to relevant learning materials in order to revise the subject. The teacher-educators used the technology to provide the learner with an assessment of her understanding of the learning material. However this assessment was not personal and was not provided directly by the teacher-educator, so that it caused additional distancing and lack of interaction between the teacher-educator and the learner.

A further application for formative assessment was employed in the natural sciences course, in which the students were required to learn many details and there was a need for supervision to ensure that the material had been learnt and assimilated during the semester. The teacher-educator therefore used a strategy similar to the strategy described in the study by Shimoni et al. (2002). This study found that distance learning courses included almost no face-to-face sessions, making it difficult for teacher-educators to examine whether learning has taken place from lesson to lesson. It is difficult for the teacher-educator to forfeit this assessment which is seen by most of them as a formative

assessment. They therefore 'solve' this by providing 'small' tasks such as reading an excerpt and analysing it almost immediately after each lesson.

Teacher-educators who use the representation mode developed a range of interactive items through computerised technology that enabled them to assess the students' knowledge and higher order thinking skills as was also found by April & Stephen (2002). But here the process was arrested. Since there was no personal interaction with each learner they in fact blocked any possibility of performing follow-up of the thinking processes of each student. This contrasts with the findings of Thron (2001) who claimed that there is more systematic follow-up by the teacher-educator in on-line courses in comparison with face-to-face courses.

The teacher-educators who taught according to the interactive and holistic modes invested time, efforts and much thought in the provision of formative assessment several times during the learning task, in a personal way for each learner. It emerged from the findings that although teacher-educators using the interactive mode declared that they used collaborative learning and peer assessment, in practice they were not satisfied with peer assessment alone. They declared in the course that there would be peer assessment but as a means to maintain their status as teacher-educators they in fact performed the assessment themselves. According to the definition of Goldstein (2001) this was 'teachers' assessment'.

In contrast, teacher-educators who used the holistic mode, who provided a wide space for peer learning, saw the main part of their role as supervision of the assessment. Thus they developed the possibility for constructivist learning among their learners. The differences found between the two modes: interactive and holistic can be understood according to the approach of Elliot (2008) who made a distinction between first generation assessment (Assessment 1.0) based on formal, classroom-based and supervised assessment and second generation assessment (Assessment 2.0) that was authentic, flexible and natural for the computerised learning environment and for the learner's computerised and authentic learning products. This latter model enabled the learners to more authentically express their knowledge,

creativity and skills. It allowed the teacher-educator to challenge the learner to understand investigative tasks, and was based more on problem-based learning, case studies, peer assessment and choice of a more varied range of subjects for investigation, to collect information and process it. This assessment mode used by teacher-educators from the holistic mode opened a window for today's students and tomorrow's teacher-educators to assess the students' answers in a digital system on the basis of the students' response model, as was suggested by Roth, Ivanchenko & Record. (2008).

Moreover, teacher-educators who used the holistic model acted similarly to the approach of Alderson (2006) in providing a response to the difference between learners. They provided the student with personal assessment tasks adapted to the learner's learning pace and needs. If necessary the learner could receive support or additional explanations, with sensitivity for special needs, such as: enlarging the fonts, reading texts, or (immediate or delayed) feedback regarding the performance. They allowed the learner opportunities to 'lead' and on the hand provided adaptations to the learner's needs with regard to the level of difficulty, speed of provision of answers, preferred level of exposure and type of representation. Teacher-educators using this mode allowed 'peer assessment' suggested by Goldstein (2001) in which the learners participate in the assessment of their peers' products and in the assessment of the extent of participation in collaborative projects. Analysis of the present research findings showed that only the holistic mode enabled constructivist learning by the students. This was also expressed in the assessment that this mode used. As was found also in other studies (Fouts, 2000; Quellmalz & Haertel, 2000) the teacher-educators encouraged constructivist learning by widening the range of learning achievements and enriching the methods for regular assessment in the class.

Hazari (2004) distinguished two types of student assessment on a forum: holistic and analytical. A holistic assessment is conducted by collecting all the students' messages and giving an overall grade. Analytical assessment is conducted by providing points for each message and calculating the total. The findings of the present research indicate a different typology of assessment. All

the teacher-educators used assessment that led to a grade and a separate grade was given for each task. However in the holistic mode the assessment of the process that the student had undergone was also taken into account and not only the points awarded for each message on the forum. In the representation mode, although the computerised tools were used to allow the students to test their own knowledge and receive a grade, this grade was personal for the student and was not taken into account for the final grade, which only considered grades given for compulsory tasks sent to the teacher (in a multi-participant course and partially in a course for a few participants). Thus the forum did not serve as a platform for the assessment of tasks.

Reynard (2009) claimed that the integration of computerisation and Internet in learning has not necessarily led to any development of more learning tasks which are creative and present challenges in comparison with non-Internet based courses. An on-line course must include critical thinking in order to enable the learners to ask questions and also to express doubt, to interweave processes of collaborative learning and to enable learners to express themselves in a challenging manner and to demonstrate their creativity. The present research findings indicate that in all the teacher-educator modes a breakthrough occurred and they did indeed create more challenging tasks than in traditional teaching. As Nachmias & Ram (2009) noted, exploitation of the potential embodied in the net for learning purposes depends to a large extent on the course instructor.

To summarise: the multiple possibilities offered by computer technology led teacher-educators in each teaching mode to perform a different type of assessment. The different assessment influenced the type and strength of the interaction and its adaptation to the new teaching methods.

In some cases, the use of technological tools and self-examination replaced more systematic follow-up by the teacher.

5.4.4 Organisation and Management of Teaching in affinity with Teacher Training Paradigms and Orientation

Teacher-educators using the different modes taught according to different teacher training paradigms and orientation. Table 9 below shows how teacher-educators in each mode saw their technology-assisted teaching mode as providing a response to, or factor in changing, different teacher training paradigms and orientations.

Table 9:
Integration of Distance-teaching Modes with a Teacher-Training Paradigm and a Teacher-Training Orientation

The Paradigm of Zeichner (1983)	The Orientation of Feiman-Nemser (1990a; 1990b)	Teaching Mode	Present Research Findings regarding integration of distance-teaching with the theories
	Academic Emphasis on subject matter Focus on transfer of a body of knowledge and development of understanding Teaching as a process whose source is academic. The teacher is an intellectual leader. The teacher's work is perceived as conditioned by his/her knowledge resources.	Representation	Use of Internet and links to many sites enlarged the teacher's body of knowledge and enabled multiple options for representation
Focus on Research Creating an atmosphere with a critical-investigative approach and nurturing skills that enable its realisation. Need for learning Teacher's critical willingness to initially identify the problems that he/she faces and only then to cope with them through accessible means.	Technical Teaching process of problem-solution and decision-making	Interactive	Very frequent student-teacher communication due to virtual communication tools, providing personal and intensive supervision. The learner acquires a critical approach and willingness to research and investigate any problem without a solution or whose accepted solution is not relevant.

The Paradigm of Zeichner (1983)	The Orientation of Feiman-Nemser (1990a; 1990b)	Teaching Mode	Present Research Findings regarding integration of distance-teaching with the theories
<p>The student becomes an active agent in the training.</p> <p>Gradual liberation of the students with the students' own efforts from prejudices, superficial impressions, baseless conventions –</p> <p>The learner acquires a critical approach and willingness to research each problem that does not have a solution or whose accepted solution is not relevant.</p>			
<p>Behaviourist</p> <p>The teacher's required knowledge, skills and fitness are specific and relevant to the teaching role and these direct the teacher's training</p>		Organisational	Teacher-focused teaching. All students receive the same tasks. There are clear criteria for assessment and the expected answers are identical – the date for completion of tasks is uniform and fixed.
<p>Personal</p> <p>The training contents need to be founded on the learner's needs that the learner is supposed to discover independently.</p> <p>The success of the training is measured by the strength and quality of the teacher's influence on the individual's development.</p>	<p>Personal</p> <p>Separates the learning and study from the content and focuses on fostering the personality of student teachers – on their personal development and the enhancement of their self-awareness.</p> <p>Focuses on the student's inner world and interpersonal communication.</p> <p>Classrooms in which the learning stems from the pupil's needs, internal interests and the principle of personal investigation-discovery (the Humanistic approach).</p>	Holistic	<p>Using Internet and interactive virtual possibilities, the individual is exposed to and can create interactions with many people and sources of information.</p> <p>This mode of teaching contributed to an increase in the learning frameworks and the student's options for research, empowering the critical approach of the students and their ability to create a new social order.</p>

Due to their intelligent use of technology the teacher-educators from the different modes were able to make a broader and different implementation of the above-mentioned teacher-training paradigms and orientations.

5.4.5 Section Summary

Table 10 below summarises the teacher-educators' modes in an overview, according to the following issues: teacher-training perspectives, focus of the teaching, assessment.

Table 10:
Teaching Modes according to Theoretical Perspectives

Mode Issue		Theoretical Anchor	Representation	Interactive	Organisational	Holistic
Teacher- training Approaches	Paradigms	Zeichner (1983)		Training Focusing on research	Behaviourist	Personal
	Orientations	Feiman- Nemser (1990a and b)	Academic	Technical		Personal
The teaching focus		Cuban (1984)	Pupil	Pupil	Teacher	Pupil
Assess- ment	Formative Summative	Scriven (1967)	Formative Summative	Formative Summative	Summative	Formative Summative
	Assessment Style	Goldstein (2001)	Independent	Teacher		Peers

In conclusion, the different teacher modes and the wide variety of technological options produced possibilities and combinations that were not previously possible/ so that a new pedagogy was created.

5.5 How did the Teacher-educators harness Technology for different forms of Interaction?

Interaction is a central component in distance learning, and needs to bridge the gap formed by the lack/ minimisation of face-to-face meetings. The differences in quality and value of the interaction are obvious in their contribution to formal/non-formal learning, and quality and nature of the contacts with regard to non-learning subjects.

The teacher-educators were aware of the difficulties that this strategy of lack of 'eye contact' with the learners involved. They understood that a strong presence of the teacher in the virtual environment through regular and unconventional means were essential in order to create a friendly learning environment that would foster wide-branching and creative thinking and enable regular interactions between teacher and student and between the students.

The research findings indicated two main trends on the subject of interaction: minimisation of interactive channels in the organisational and representation modes as opposed to multiplicity of interactions in the interactive and holistic modes. The differences are expressed in the group in the teacher-student interaction (Moore & Kearsley, 1996), in the teacher-students interaction (Moore & Kearsley, 1996; Rossman, 1999) and between the students (Wilson & Ryder, 1988; Anderson & Garrison, 1998; Goldstein, 2001; Hughes et al., 2002 Picciano, 2002) and in individual teacher-student contacts (Rossman, 1999). The amount and frequency of interactive channels influenced the sense of connection between the teacher-educators and the isolated student or group of students and contributed to or blocked the strength of the relationships that were formed.

5.5.1 Face-to-Face Sessions

In all the modes, apart from the representation mode used in the multi-participant course, there were compulsory face-to-face sessions at the beginning and at the end of the course. The content of these sessions corresponded with the teacher-educators' work method for all the aspects of the course. All these sessions included demonstration and experimentation with the virtual tools in the initial meeting and a summary of the course in the second session. The holistic and interactive modes thought it important to strengthen the interaction with and between the students, so that they also held sessions during the course in order to maintain the momentum of the learning, and to answer queries. These findings are supported by previous research findings (Moore & Kearsley, 1996; Treacy et al., 2002).

The teacher-educators who used the representation mode in the course with a few participants exploited the face-to-face sessions during the semester to conduct experiments in the laboratory, and saw these lessons as a layer of her academic teaching.

This contrasts to other studies (Lazarowitz et al., 1985; Tobin, 1990; Lazarowitz, 1991) that indicate that science laboratory activities require team work and cooperation, the atmosphere is less formal (than a classroom) and there are more possibilities for teacher-student and student-student interactions. On these occasions there is potential to develop positive social interactions, which assists the creation of a positive and constructive learning climate. The teacher-educator, who used the representation mode in the course with few participants, did not see these sessions as having the goal of achieving a better interaction with the learners. This can be explained by the small number of sessions and the academic setting that did have the necessary power or ability to tighten the social interaction.

5.5.2 Virtual Meetings

In line with previous research findings (Brooks & Kopp, 1989; Chesebro & Bonsall, 1989; Adkins, 1991; Hara, Bonk & Angeli, 2000; Lindsey-North, 2000; Trentin, 2002), all the teacher-educators, in all the modes, used the forum as their main technological tool forming a platform and a location where they could build a teacher-student interaction and a group interaction. However the present research findings indicate that each of the teaching modes used the discussion group in a different fashion. Different teaching methods and work in the forum influenced and were influenced by the forms of interaction that were spun between the teacher-educators and students.

The Organisational Mode forum was almost the single virtual communication channel activated in the course and almost the single means for creation of communication and interaction between the teacher and the students. The teacher-educators' presence in the forum was infrequent and they did not succeed in developing collaborative learning by the students. On the declarative level, the teacher-educators viewed their role in the forum as promoting three very important pedagogic subjects: fostering independent learning, peer learning and going deeper into the studied subjects. However, in their managerial-organisational perception they aspired to achieve efficient work and so blocked their ability to attain these goals. This work method can be understood through the concept of Brochet (1989) who claimed that the key to creating an active forum with a rich learning experience is the accessibility of the instructor: the ability and willingness of the instructor to be attentive to the different needs of the forum participants and immediate responsiveness to their requests increases the extent of their motivation to participate in the forum and consequently their satisfaction with regard to the experience of learning in the on-line environment. However, in this mode the teacher-educators participated minimally and this influenced the low entry of students into the forum, a finding paralleled by the finding of Hara et al. (2000) that most of the students restrict their participation to course requirements.

Contrastingly, the teacher-educators from the representation and interactive modes were frequently present in the forum but each of these modes directed it to other domains.

The Representation Mode used in a Multi-participant Course. There was a high frequency of teacher entries that served to respond to students' questions, queries or clarifications. Teacher time was saved by provision of collective responses instead of individual responses for each student. Combining a number of questions to form one broad comprehensive answer on a subject saved time for students, since they did not need to read several reactions on the forum, and it was also possible to give one answer to a number of questions on similar or close questions. This teaching mode enabled the teacher to overcome her inability to provide a personal answer for each one because of the large number of participants. Anderson & Garrison pointed to this difficulty of serving communities that include a large number of learners. The teacher in the present study actually used the forum as a tool to transmit information from the instructor to the large group of students, a strategy defined by Hiltz (1988) as a 'mass model', and not as a place for the development of an interactive relationship between her and the many learners or between the learners themselves.

The Representation Mode in a Course with Few Participants

The teacher-educators' motives for entry into the forum were identical to those of the teacher in the multi-participant course. However, using artificial means the teacher-educators then tried to develop collaborative learning among the students, but failed. One of the reasons for this was apparently the discipline taught which includes accurate, scientific facts (Roberts, 1983) that are not congenial to the development of a discussion. The course was based on the acquisition of knowledge concerning specific scientific subjects and memorisation of a large number of terms that are central to this area of knowledge. The studied subjects in the course were not controversial and therefore there was no justification for the presentation of polarised views or debate.

In contrast teacher-educators using the **Interactive Mode** demonstrated an intensive presence on the course forum. Previous research shows that students' presence in the forum varies, so that interaction between students becomes an important factor (Wilson & Ryder, 1988; Anderson & Garrison, 1998; Goldstein, 2001; Hughes et al., 2002; Picciano, 2002). In addition, teacher-educators used the forum as a means to examine the students' presence (Anderson et al., 2001; Garrison and Anderson, 2004) and they were very careful to ensure a very frequent entry by the learners. An important finding that emerged from this study relates to the teacher-educators' very frequent participation in the forum in order to supervise the learners and so that they would not lose their status, authority and charisma. The result is that the teacher-educators using the Interactive mode reached hundreds of entries into the forum per semester. This teaching mode contrasts with the views of Schrader (2008) who claimed that teacher-educators should often loosen their direct control and enrich the computerised environment with challenges, contents and projects. Rovai (2000) claimed that immediate feedback is preferable to delayed feedback, and effective feedbacks are those which enable the flow of the course and prevent the learners' sense that no-one is relating to their expressions. Feedback and attention by the instructor served as significant motivating factors for the learner. This interaction was important to the same extent for the instructor, who led and guided the learning process, as was found by Goldstein (2001).

Teacher-educators who used this mode came from the field of literacy so they harnessed the forum to 'write speech'. The discussion was conducted in the on-line discussion group through texts. The sender sent a written message and the recipient read it. Drafting was informal, dynamic and direct (Birenbaum & Feldman, 2002).

The use of written language enhanced the quality of the communication process, since the writing helped to improve organisation and clearer representation of the messages in contrast to speech. However, lack of eye

and vocal contact reduced the range of options that the participants could use for their non-verbal and oral messages. This communication deficiency forced the participants to use written communication and to search for compensation in written language. The interactive mode created intensive interaction but this was not necessarily aided by a variety of technological tools.

This differs from the work of teacher-educators who taught according to the **Holistic Mode** who perceived the forum as a main tool for promoting the subject of teaching and learning, as was found in other modes, but their main presence was expressed 'behind the scenes'. They were afraid that their intervention in the forum was liable to prevent independent thinking, and might block the personal and professional development of the learner. They 'spoke' relatively little and thus enabled the students to think, create and act more freely. Over the years as they accumulated work experience a change occurred in their perception of the extent of their intervention in the forum. In the past they had 'spoken' a lot. Alvarado (2006) claimed that teachers speak more in synchronised communication in comparison to face-to-face communication in a classroom. However, teacher-educators who used this mode understood that they had to alter the extent of their responses, because in this way they prevented or reduced the students' right and ability to speak. They saw themselves as equal to the students and this was expressed not only in the frequency of their intervention but also in the type of intervention that they conducted in the forum. Nevertheless, the fact that they remained 'behind the scenes' did not mean that they were passive; they entered the forum each day to read, follow and learn although they did not leave any 'footprints'. As Feenberg (1989) explained, they perceived the forum communication as egalitarian and provided an equal opportunity for everyone to express their opinion and present their views in an open and democratic manner.

Salmon (2003; 2004) claimed that the responsibility and the control for the existence and progress of a discussion on the forum, does not lie solely on the teacher, since the learning forum does not necessarily have a recognised hierarchy as does the traditional classroom in which the teacher is perceived as

responsible for the learning process, directing the learning process and providing the knowledge. The group discussion leader should reduce his/her participation as the group progresses; on the other hand Mabrito (2005) claimed that participation in the forum should not be left entirely to the students' initiative. Thus the teacher-educators using the holistic mode often initiated discussions on the course forum in order to create a continuous momentum of discussions and interaction. The moment that the students saw that the teacher sometimes created an initiated discussion on the forum they began to understand that the matter was important for their learning of the course. Nevertheless, Mabrito (2005) noted that it would be advisable if the instructor would not only initiate a new discussion on the course forum but would also enter during an existing discussion and respond specifically to students' messages. This ritual would encourage students and motivate them to further thinking. This approach is preferable to the initiation of new subjects, since the discussion thus becomes more profound and flows naturally. Using this strategy the teacher-educators prevented artificial discussions on the forum completely controlled by the course teacher and guided students to peer learning. They actually used 'power' and authority to construct a community of learners in line with the comment of Pedulko & France (2003) that the success of a community of learners depends strongly on its leader.

Their support of collaborative learning through the forum was broad and profound and they used the forum as an organising axis for peer learning (Hiltz, 1988). They saw their role as supporting and supervising the discussion to ensure that the learning relationship between the students would not breakdown during the semester. The existence of this communication promoted collaborative learning throughout the course (Cole & Wertsch, 1996; Barron, 1998), and contributed to the establishment of trust relations between the students and between the teacher and the students. Thus the commitment of the teacher and encouragement and incentives for the learners and also the provision of opportunities for learners to transmit not only information but also social messages between them were essential tiers in the effectiveness of the on-line course (Buss, 2001). In order to ensure that their courses would

stimulate and promote effective interaction, they examined the following two conditions indicated by LaMonica (2001):

1. The students understood their expectations from the teacher and from the course.
2. Different possibilities existed to provide feedback and to create feedback between students and the teacher.

In line with the findings of Oren et al (2000), it can be seen that the teacher-educators who used the holistic mode constructed a community of learners with the students that dealt with the exchange of knowledge, exchange of opinions, collaborative learning and data-processing, while exploiting the advantages of technology for the relationship between the participants beyond the limits of a specific time and place. They based the community's activity on the creation of knowledge, its distribution and maintenance with different tools. Wood (2007) claimed that active learners' communities that create and distribute knowledge are preferable from a pedagogic point of view to passive communities that tend mainly to absorb knowledge. This practice induced their students to participate more than they would in a face-to-face course (Hillman, 1999).

The presence of the teacher-educators using the holistic mode within the community of learners contributed to a diminution of the students' sense of isolation and alienation. The community enabled students to feel that they belonged to the community and provided social and academic support. Other studies have indicated that the success or failure of an on-line course depends on whether learners regard themselves as part of the community or feel that they are outsiders (Scardemelia & Berieter, 1996; Wegerif, 1998; Shea et al., 2001, Rovai, 2002).

Mutual relations between the learners provided them with learning advantages since the learners were exposed to different viewpoints and experienced deeper learning than occurred when studying alone.

In the holistic mode, the teacher-educators saw interaction between the learners as important; this was supported by previous studies (Fulford & Zhang, 1993; Zirkin & Sumler, 1995; Klesius et al, 1997; Verneil & Berge, 2000). The teacher-educators taught the students how to support one another. Support for this approach can be found in the work of Aune (2002).

In addition to the collaborative learning in the community, the teacher-educators created special spaces for the students alone for a-synchronic communication. These are parallel channels for project teams or common task groups in an on-line course, where the same students can split off from the main forum into a secondary forum of their own. In these closed on-line spaces there was often brain-storming activity and collaborative work between small groups of students. The students benefit significantly from the interaction with their colleagues in a project or task, without any fear and without anxiety regarding the reactions of the large group (Slavin, 1996; Chester & Gwynne, 1998; Severn, 1998).

A different analysis concerning the teacher-educator's teaching method, presence and the strength of the interaction practiced by each of the teaching modes acts can be performed in light of the model of Salmon (2004). This model indicates that there are different development stages for a learning forum, and that each stage requires different guidance skills from the teacher. Salmon indicated that there are five such stages, and in her opinion it is impossible to skip any of the stages. The present research found that all the teaching modes exhibited the following three conditions: the forum has a clear goal, technical assistance is available and the teacher knows her/his role.

In the following table, Table 11 the activities of each mode are set out according to the stages described by Salomon (2000).

Table 11
Teaching Modes' Practice in the Forum according to
Development Stage

Stage	Instructor's Role	Mode(s) blocking this stage	Mode(s) that comply with this stage
According to Salomon (2000)			
Entering the Forum	<ul style="list-style-type: none"> - Becoming acquainted with a new learning/teaching environment - Inviting and encouraging learners to participate in the forum. 	None	All the teaching modes
Social acquaintance among the forum participants	<ul style="list-style-type: none"> - Increasing the number of the learner's interactions - Guiding the learners to 'peer learning' using a social basis for communication that will continue in the learning field. - Assistance for learners in creating communications 	<ul style="list-style-type: none"> - Representation, interactive and organisational - Although in interviews and in staff meetings the teacher-educators declared that they intended to lead students to collaborative learning, they failed to do so. They skipped the second stage of social acquaintance between forum members. 	<p>Holistic – opened a special forum just for social matters.</p> <p>Support an increase in the number of interactions between the learners and provide an opportunity for students to lead the discussion.</p>
Exchange of information and development of a learning process	<ul style="list-style-type: none"> - Provision of stimuli that will engender the learning process. - Setting learning tasks 	<p>Representation – most tasks are not entered into the forum, so that this stage remains barren.</p> <p>Organisational – the tasks are uniform and do not provide stimuli.</p> <p>Interactive – there is much activity on the forum supported by intensive personal feedback that each student receives from the teacher so the students do not sense a need to exchange information between them.</p>	<p>Holistic – Succeed in completing the second stage: social acquaintance successfully, so that they succeed in enlisting the students for j collaborative learning and to the forum so that students also contribute and direct the knowledge while providing emotional and social stimuli and different learning information that stimulate the learning process.</p>
Construction of the knowledge	<ul style="list-style-type: none"> - Development of high level thinking processes - Teacher functions as 	Interactive – the teacher-educators continually enter the forum and react, leaving no room for the students to develop	Holistic – the teacher-educators very frequently enter the forum but rarely participate in it.

Stage	Instructor's Role	Mode(s) blocking this stage	Mode(s) that comply with this stage
According to Salomon (2000)			
	<p>one of the forum participants, expressing a personal opinion on the discussed subject.</p> <ul style="list-style-type: none"> - The teacher can change the accepted perception because the teacher is a source of knowledge - Participants are given opportunities to act and take responsibility for the development of their own learning process. 	<p>a collaborative learning process.</p> <p>Teacher-educators still hold on tightly to their status as teacher-educators, they see the teacher as the source of knowledge.</p> <p>Representation –Although they alter the conventional view that the teacher is the source of knowledge and allowed participants to be active and take responsibility for their own learning process, in the forum the teacher leads and is the one who knows and not an equal member.</p> <p>Organisational – No dialogue develops on the forum. The tasks are uniform and not open to discussion.</p>	<p>They harness the social presence in such a way that the community of learners can easily sense what it means to 'give and to 'take knowledge from their colleagues and to construct something new and other together.</p>
Development of the learning	<ul style="list-style-type: none"> - Training the participants to develop high thinking skills. - Providing an opportunity for learners to summarise their understandings regarding the discussed subject on the forum and to reflect on the learning process of other learners. 	<p>Interactive – Students help one another but only at the stage of data-collection. In practice no true collaborative learning occurs since the teacher is continually involved.</p>	<p>Holistic – true collaborative learning only takes place in this mode.</p> <p>Further support for this was provided by Wenger (1998) who indicated that in order for a group of students to become a community it must first become a group. But in order to define a group of students as a community, of learners, the students must first discover mutual involvement in the learning, ability to see learning tasks as a common experience and have the ability to share the knowledge that they have.</p>

In conclusion, different perceptions of teaching and characteristics of teaching a particular discipline blocked or facilitated different levels and strengths of interaction that were formed in the forum between teacher-educators in different modes and the students and between the students.

5.5.3 Social Presence

Only the teacher-educators who used the holistic mode saw the social dimension as a significant component that influenced the learner's sense of being an 'insider' or 'outsider' and the sense of success or failure in the course (Wenger, 1998). Thus all the activities in the social area that they activated with and between the students contributed to the sense of closeness (Mehrabian, 1969). From this viewpoint they enabled the students to break open the relations so that it was not only with students learning in the course. They used the on-line environment to broaden social connections with people, without limiting them to people with whom they could meet physically in person (Baal Schem & Shinar, 1998).

In their approach and understanding of the position and importance of social relations they implement the findings of Coghlan & Stevens (2000) who claimed that social activity between learners is an essential condition for the success of the course, and thus, the teacher should foster and develop a community, and encourage the learners to regularly correspond with one another and to collaborate on tasks, so that this also contributes to the development of thinking. They explain this process by relying on the findings of Resnick & Rusk (1996) who noted that there is a growing awareness that thinking takes place through an interaction with other people, often with the assistance of mass communication means and technology.

The integration that they performed between the social and the learning dimensions corresponds with the findings of Burge (1994) who claimed that 4 types of peer behaviour are necessary for effective learning: participation (expression of a personal opinion and testing other ideas); reaction (constructive feedback, positive reactions to others); a personal reaction (using colleagues' names, demonstrating patient, friendly and formative behaviour), since good learning takes place within a team and by a team. Achievement performances testifying to better understanding are only achievable in a team and through its work. Salomon (2000) claimed that we are not only social creature but also and perhaps especially we are social learners.

Social interaction between the participants had a positive influence on the active participation of learners in the discussion group and also on the learning process and its products (Na Ubon, 2005). They envisaged two main types of social interaction which should exist between the learners (Insung, 2002):

1. Collaborative interaction between learners for learning tasks.
2. Interpersonal interaction, the social component that includes personal relations between learners and their teacher-educators or between the learners.

This meant that their presence as teacher-educators was expressed on three levels:

1. Emotive reactions including the use of emoticons (symbols), humour and self-revelation. They enabled learners to express themselves socially and emotionally within the setting of the community of learners with emotional words, humour, personal openness and willingness to share personal information, expression of praise and encouragement, congratulations etc. (Swan, 2001).
2. Interactive reactions, including reactions to messages of others, direct quotations and reference to content of the messages of others (Arnold and Ducate, 2006).
3. Reactions that increase group cohesion, including sharing feelings instead of transferring information referring to others by their names and to the group by their names, so that they emphasised belonging (Rourke et al., 1999).

Anderson & Garrison (1998) indicated that interaction between students enabled the student to be less dependent on the teacher and decreases the amount of teacher-student interactions. However due to their social presence the teacher-educators who employed the holistic mode bridged this gap.

Their teaching mode and the fact that they thought it important to construct a learning community (Brown, 2001; Mcox & McDowell, 2008) led the teacher-educators using the holistic mode to understand that their social presence assisted special student populations.

1. The public nature of discussions, also enriched the learner who chose to be a 'silent learner', even if the learner was not active and did not contribute his opinions and understanding to the discussion the very fact of being exposed to the discussions enriched the learner's world and helped to construct personal knowledge. Additionally students who found it difficult to express themselves orally in the classroom were able to succeed with the assistance of the forum in achieving collaboration with other students in their class (Mason, 1998).
2. Some of the students with learning disabilities did not create social interactions in a traditional class. In the on-line course where they had time to compose their words, they were more willing to expose themselves (Cook & Gladhart, 2002).
3. Preventing dropout of students from the course. This phenomenon could stem from a decline in the sense of community, a sense of detachment, isolation and lack of personal attention and lack of direction and motivation (Rovai, 2001). Contrastingly, an increase in conversation between participants and their participation in assessment and learning in small teams reduces the drop-out from courses (Killion, 2002).

5.5.4 Personal Interaction

The research findings indicated a dichotomy with regard to the different consideration that teacher-educators gave to the web of interpersonal relations in the interaction between the teacher and the individual student. Teacher-educators who used the interactive and holistic modes saw the interpersonal interaction as a powerful and meaningful component in their teaching method. In both the other two modes: representation and organisational there were very few ways of interaction between teacher and student but the reasons and interpretations given by the teacher-educators for this differed:

The Representation Mode used in the multi-participant course because of its scope and the large number of participants cannot provide a response to this issue. Anderson & Garrison (1998) claimed that teacher-student interaction would be possible in independent learning but not for a large group of learners. While the teacher, who used the representation mode with a few participants, saw herself as a lecturer in an academic discipline who needed to expose the learner to purely learning subjects through a variety of data representations and not through the creation of a personal relationship. The reason for this was perhaps to be found in the fact that she had not been trained for teaching and had acquired all her education in academic institutions, so that her teaching skills were minimal (Goodlad, 1990; Hativa, 1997).

In contrast teacher-educators using the **Organisational Mode** who dictated the teaching method in accordance with their choice of a work method that emphasised effective use of time and so did not create any personal interaction with the learners. This issue gained reinforcement from the research findings of Serwatka (2002) who emphasised that students who participated in virtual course may sense that they are isolated in the virtual space, especially if they are not in the habit of checking their e-mail regularly, or do not tend to ask questions when a problem arises. One of the ways to overcome this is to hold virtual reception hours, during which questions can be asked and receive an immediate response, to provide swift response for tasks which were presented for examination. But because much time is devoted to this activity, the teacher-educators chose not to use this strategy. In addition they did not chose the approach of Mabrito (2005) who coined the expression '12 hour rule', that he used in his on-line course, answering all e-mail messages within 12 hours from the time of receipt. All this is in principle performed each week. At peak times, such as the beginning of the semester and a few days before students have to present exercises this rule becomes a clearer commitment. And the teacher-educators definitely did not act according to the approach of Young (2000) who suggested that e-mail should be checked three times a day, especially at the beginning of the course.

At the other extreme of the continuum of interaction are the **Interactive and Holistic Modes**. They viewed the tightening of interpersonal interactions with each learner as a central component in their pedagogic teaching method for the teaching of each student, for the quality of the interaction between the teacher and the learner and for the learner's sense of involvement in the course (Moore, 1989; Moore & Kearsley, 1996; Anderson & Garrison, 1998; Mullen & Tallent-Runnels, 2005; Mcox & McDowell, 2008).

Gelbart (2000) added that a speedy response to students' requests in a distance course constitutes a factor that increases the student's confidence and motivation in the course. So that the teacher-student interaction can be effective it is very important that there should be on-line support because there are higher rates of dropout of students from on-line courses than in face-to-face courses. Thus, each teacher thought it important that the student should feel comfortable, and understood that they needed to focus on the individual's needs and cooperate with the student (Killion, 2002) because the learners needed more encouragement and support (Galland, 2002). Using their perception of the importance of personal interaction with each learner they succeeded in bringing their teaching and the students' learning to another level. Personal interaction contributed to the teacher's personal tutorage of each learner and led the students to achieve very high-level products in comparison with their abilities or their products achieved at the beginning of their studies. This finding is supported by the findings of Romeo (2001) that adult students took an on-line course because they believed that they would have a stronger connection with the teacher and would receive more feedback concerning their work in comparison to a face-to-face course.

Earlier studies (Tagg & Dickenson, 1995; Moore and Kearsley, 1996; Lynch, 2002) indicated that the creation of a personal connection between the teacher and the learner contributes to overcoming the sense of isolation that the learner feels when he/she sits alone at home. The teacher-educators saw the construction of this personal interaction as part of their teaching presence (Garrison and Anderson, 2004,). In order to reach this relationship they took a number of steps as suggested by Lynch (2002):

1. Taking responsibility to provide a sense of comfort for the learner in the contact with the teacher.
2. The goals of the course are clearly set out in the syllabus and for each unit.
3. Adaptation of the course for the student's needs.
4. Mutual respect is maintained in all forms of on-line communication.
5. Continuity is created.

This is supported by Jiang & Ting (2000) who studied factors that influenced students' perception of on-line course learning. They found that three components of 'teaching presence' had an impact on the student's achievements: the time devoted to teacher-student interactions, establishment of clear expectations concerning the teacher-student interaction and provision of supportive and timely feedback. Further studies found significant correlations between students' reports concerning high levels of teacher presence behaviours and their level of satisfaction concerning learning in on-line courses (Shea et al., 2003; Shea, Pickett & Pelz, 2003).

In order to further the personal teacher-student interaction the teacher-educators harnessed technological tools, exploiting the advantages of e-mail for the educational aspect: easy for communication, good for people who have difficulty in a classroom, enables informal communication, provides the teacher with tools to examine works by adding remarks and using 'track changes' for amendments (Goldenberg et al., 2002; Lynch, 2002). If students delay their replies they send a personal e-mail in order to assist and encourage them (Treacy et al., 2002).

In the above-mentioned modes the teacher-educators also harness the forum as a means to overcome the student's isolation. It transpired that some of the students sometimes found it difficult to conduct a synchronised discussion in real time with the teacher on the Internet, both because of slower reactions and because of the need for planning and prior consideration of their answers, so

that they channelled part of the interaction between students and teacher to a-synchronic meetings on the course forum (Mabrito, 2005).

Teacher-educators from the **Holistic Mode** promoted personal interaction with each learner in different ways to those mentioned before, and used an additional a-synchronic channel in a personal file that was used by the teacher for the individual student. In this file the learner collected all his/her works and the teacher examined them at a time suitable for him/her. Only the teacher and the learner had access to the file with the use of a special code (Lynch, 2002). They also used Skype (<http://www.skype.com>) as a synchronised communication channel for student-teacher dialogue and thus encouraged learning (Pan, 2005; Pan & Sullivan 2005). Additionally, they also employed these communication tools for informal communication of the teacher with the student (Goldenberg et al., 2002; Lynch, 2002).

Mason (1994) indicated that there are three types of course participants: active participants, lurkers (those who read messages but do not post messages and those who do not take part. Using the special and different means of virtual communication the teacher-educators provided a response to each student's behaviour style and response on the forum.

In conclusion, the virtual communication tools constituted a personal channel for teacher-student communication while the amount and manner of use was derived from the approach of each teaching mode.

5.5.5 Section Summary

The fostering and deepening of interaction with each learner constitutes a significant part of their teaching for teacher-educators using some of the modes. This was especially evident in the interactive and holistic modes. The interactive mode used technological tools: the forum and e-mail in order to provide a multi-occasion response to the student while the holistic mode employed a range of technological options to improve personal interaction with each learner. Contrastingly, teacher-educators using the organisational mode (due to considerations regarding their work efficiency), and the teacher-

educators using the representation mode (due to the large size of the learning group, and/or teaching methods of the discipline and lack of teaching skills), chose not to foster this area.

This division between the modes regarding strength and type of interactions runs as an interconnecting thread through interactions with the group and with the single student in face-to-face and in virtual meetings, so that the teacher-educators who taught education disciplines are at one end of the continuum and teacher-educators who use the holistic mode provide the most complete response with their social presence.

5.6 Chapter Summary

The research focused on a case study conducted in a single teacher-training college in Israel. The research methodology was qualitative enabling the researcher to reach all relevant documentation, and to conduct observations on/ with the teacher-educators who were involved in the transition to distance-teaching, using the Internet. The researcher recorded the entire research proceedings in a personal log, including her resulting thoughts and insights and an interpretative clarification of materials.

The purpose of the research was to try to reduce a gap in knowledge, concerning the teaching modes of teacher-educators working in distance-teaching in a teacher training college. A gap was created between the existing knowledge on traditional methods of teaching and the new modes of teaching created by the transition of teacher-educators to distance-teaching. A long list of previous studies, publications and academic consideration already existed on school teaching modes but very little has been written on teacher-educators (Cochran-Smith, 2003). There are also few findings regarding the entire issue of distance-teaching in higher education, less even on this strategy in teacher-training colleges, especially in Israel (Guri-Rosenblit, 2004) and this is the first and unique study of the large, central college in which the study took place.

The research examined the internal and external motives that led the teacher-educators to transfer from learning in another fashion. The way in which lacking knowledge was acquired was predetermined and the learning method was organised and structured. It turned the veteran educated teacher into a 'novice'. A new undefined teaching mode was spun in the teacher-training college and each teaching acted in a different manner, integrating and combining technology in different ways for different applications and goals in teaching and learning. The teacher-educators found it difficult to form a balance between knowledge, pedagogy and computerisation and to create pedagogic flexibility in the application of computerisation in teaching. The haste with which the change was introduced led to the professional transition but did not achieve full professional development for the teacher-educators.

The research findings indicated four different teaching modes employed by the teacher-educators, related to different learning disciplines. Teacher-educators who used the representation mode taught natural sciences and statistics, teacher-educators using the interactive mode taught literacy disciplines, teacher-educators using the organisational mode taught the discipline of education and teacher-educators who used the holistic mode taught the disciplines of education and literature.

The research analysed and provided interpretation according to three main dimensions of teaching: organisation of knowledge, organisation and management of teaching and interaction and the web created by these dimensions with technology. The integration of these three dimensions led to the creation of a new pedagogy.

Each group of teacher-educators in each of the identified modes had a good command of the discipline that she/he taught. They each had access to the same virtual environment and technological tools and the desire and willingness to make a change but each of these different types of teacher-educators integrated pedagogy with these tools in a different manner creating the different teaching modes. This weave of thinking, activity and coping with difficulties and solving problems, contributed to the characterisation of the

different teaching modes for teacher-educators who were computer-users or computer-literate.

The two modes used by teacher-educators teaching the disciplines of education and literature exhibited outstanding contradictions between them that stemmed from a complex of characteristics. The teacher-educators from the representation and holistic modes made a broad use of the subject of organisation and data representation using a wide variety of multimedia possibilities and because technologically literate in contrast to teacher-educators from the organisational and interactive modes who gave a more limited response in these areas.

Teacher-educators using the representation, holistic and interactive modes placed the learner at the centre and promoted learner-focused teaching as opposed to the organisational mode that employed teacher-focused teaching. Examination of the teaching modes in light of the adult learner's needs shows that the holistic mode most significantly adapted teaching to their needs, but none of the modes provided an answer to all the needs and learning styles of the adult learner.

Only the holistic mode provided a true response to the requirements for constructivist learning due to the integration of social presence in this mode. Assessment, that constitutes one of the cornerstones of any teaching developed in a variety of ways beyond formative and summative assessments and used the abilities of the computer to provide assessment without the human intervention of the teacher. This was especially evident in the representation mode and led to assessment as a solution and response to a complex of needs.

Chapter 6: Conclusions and Implications

The transition of teacher-educators who teach teacher-training to the strategy of distance learning created a new pedagogy founded on adaptations concerning organisation of data, organisation and management of teaching, interaction and their dialogue with technology. The research findings indicated that this new pedagogy was expressed in four teaching modes associated with different academic disciplines.

The 'new knowledge' that emerges from this research relates to a New Pedagogy that was described by the respondents in this research. It is characterised as learner-focussed and not teacher-focussed, relying on and integrating collaborative learning and providing interpretation, meaning and different applications for three main dimensions of teaching: organisation and information representation, organisation and management of the teaching, relationships and types of interaction. The pedagogy is simply the auxiliary tool that supports and feeds the option of transformation to the New Pedagogy.

Although the research is a case study, it is possible that the conclusions can be applicable in other teacher-training colleges in Israel, when teaching disciplinary subjects in the academic education system and other higher education institutions.

The real contribution of the research is the disproval of prejudices concerning distance-teaching, especially responding to those who resist the use of this strategy, claiming that it is impossible to create an interpersonal interaction and that everything is done by the computer so that the teacher has no role to play in this environment and becomes superfluous. Additionally there are those who interpret distance-teaching as a sort of laziness, since the teacher does not have to appear on a particular day, to 'maintain' and supply content and attractiveness for the students. This research leads to the opposite conclusion indicating the importance and centrality of the teacher in guiding the distance-teaching and learning and developing other, new and additional areas of responsibility.

Although the findings are not definitive due to the fact that the chosen research methodology involved a case study of a single college, nevertheless they have implications for distance-teaching methods and especially with regard to the influence of different disciplines on the shaping and characteristics of teacher-educators' teaching modes in Israel's teacher-training colleges.

6.1 Factual Conclusions

General

1. Four teaching modes were found among the teacher-training college teacher-educators who employed distance-teaching.
2. There is an affinity between the academic disciplines taught and the teacher-educators' teaching modes of teacher-educators using distance-teaching in the teacher-training college.
3. Each group of teacher-educators from different disciplines harnesses technology in a different way. Teacher-educators teaching sciences focus on the organisation of data, teacher-educators teaching literacy focus on interaction. Teacher-educators who teach education are characterised by two opposite modes – some focusing on organisation and management of teaching and learning, while others focus on three dimensions.
4. The teaching modes are characterised along a continuum according to three dimensions:
 - a. Organisation of data: multiple data representations, multiple levels of data and data links – few representations, few levels of data and data links.
 - b. Interaction: Many types of interaction – few types of interaction.
 - c. Organisation and management of teaching: Open and flexible – Fixed and focused.

5. The use of technology and virtual tools relies on pedagogic approaches and creates a difference between the teacher-educators in the way that they conduct their dialogue with technology. They are either technology users or technology-literate.

The Transition to Distance-teaching

1. There is no clear policy regarding the role definition and commitment of teacher-educators teaching distance-teaching.
2. The haste in introducing change led to a professional change but without achieving full professional development for the teacher-educators.
3. There is a gap between perceptions and performance. All the teacher-educators reported that they had changed their teaching methods but in practice this was not true for all of them. The use of technology and the transition to distance-teaching only provides a framework for innovation and does not constitute the innovation itself.

Organisation of Data

1. Use of plentiful data representations characterised the sciences and education disciplines.
2. Broadening sources of data from other sites or communication with colleagues enriches sources of information available to the learner.
3. Broadening sources of information in the course from other sites of colleagues reduces dependence of the learner on the teacher and may dim the teacher's charisma.
4. There is an affinity between computer-literacy and the use of a variety of data-representations.

Organisation and Management

1. The teacher-educators teaching distance-teaching devote different amounts of time to each teaching component.
2. The transition to distance-teaching created:
 - a. A new pedagogy.
 - b. A new role of organisation and management.
3. None of the teaching modes found in the research provides a full response to all the needs and learning styles of the adult learner.
4. Due to the use of technology the student can exercise each new academic subject several times but the examination process does not require the teacher's time.
5. Learning tasks are constructed in a different way, adapted to the new learning environment and the possibilities created by multiple data-representations.
6. The organisational mode only harnesses technology for the technical organisation of teaching and not for pedagogical organisation so that in fact the teacher still teaches according to the traditional approach and does not undergo transition.
7. Distance-teaching is not suitable for all teacher-educators, or for all students.

Interaction

1. The use of virtual tools for assessment decreases the potential to create teacher-student interaction.
2. Technology can serve as a means to tighten interpersonal teacher-student interaction.
3. Integration of social presence in teaching contributes to the interaction between learners and decreases the student's dependence on the teacher; ignoring social presence blocks the power and strength of distance-teaching and learning.

6.2 Conceptual Conclusions

Analysis of the research findings identified four teaching modes associated with different academic disciplines. These modes can help to characterise teacher-educators, in contrast to indices based on the personality factor used to characterise teacher-educators using frontal teaching.

At the junction of pedagogy with technology and with the change in location, time and character of the lesson, a new teaching mode is formed necessitating a redefinition of the teacher's role in the new field of distance-teaching. This means that, a veteran teacher, who transfers to teaching distance-teaching and integrates computer technology, begins this work as a novice and must undergo all the development stages to become an expert (Dreyfus, & Dreyfus 1986).

Integration of the computer and distance-teaching through the Internet led to a new pedagogy in teacher-training, in line with the claims of Mishra & Koehler, 2006; Koehler & Mishra, 2008). Although scientific disciplines are defined as teacher-focused teaching (Neumann, 2001), nevertheless assisted by distance-teaching and Internet applications they became learner-focused.

Additionally, despite prejudices concerning this issue, indicating that distance-teaching cause distancing in teacher-student relations, distance-teaching can in fact support close teacher-student relations. Daily interaction on the net actually tightens relations. The teacher's evident appearance on the forum or covert appearance as 'lurkers' and activity in the other communication channels increase interaction between learners and promote collaborative learning in a community of learners, as in the model of Salomon (2002).

The encounter of technology with pedagogy in distance-teaching also contributed new dimensions to the application of Zeichner's (1983) paradigm and Feiman-Nemser's (1990a; 1990b) orientation.

To conclude: this research showed that the teaching modes employed by teacher-educators using distance-teaching in a teacher-training college, have a very significant influence on the way in which data is organised and represented, organisation and management of teaching, and types of interaction while exploiting technological possibilities and adapting teaching to learners' different learning styles for various academic disciplines.

The teaching processes and modes provided a new and additional dimension in the application of the classic paradigm of Zeichner (1983) and the orientation of Feiman-Nemser (1990a; 1990b). Teacher-educators using the holistic and interactive modes used an open and flexible style and were noticeable in their use of multiple channels of interaction and especially their personal interaction with each student. In contrast teacher-educators using the interactive and organisational modes used fewer interpersonal interactions and supported teaching with fixed and focused teaching.

The teacher-educators from different modes used face-to-face meetings in a different manner through the virtual communications media and created different models of teaching mode. The teacher-educators who became forum directors formed different teaching, direction and mediation styles. Due to the various different uses of the on-line environment, in which distance-teaching was performed, the teacher-educators constructed a new pedagogy of teacher-educators in distance-teaching of teacher-training.

6.3 Limitations of this Research

Despite all that has been said above regarding the validity and reliability of this research, there are certain limitations to this study that the researcher would like to note.

The study is theoretical and does not provide any understanding regarding a possible correlation between the different teaching modes and students' achievements, or the students' experience during the course.

The research boundaries prevented a long-term research that would compare novice teacher-educators with teacher-educators with years of experience in distance-teaching.

The researcher also notes three limitations that characterised the research and restrict broad generalisations from the findings to other educational systems in Israel or other countries.

The case study was conducted in one teacher-training college in Israel. It is difficult to generalise these findings to other such colleges in Israel and other countries.

Gender – Most of the participants were women and no gender distinction was recorded for the findings and their interpretation. This makes it difficult to generalise the findings for men, although no personality or psychological aspects were considered, which could cause differences between the sexes.

Not all the disciplines were studied – in the years during which the research was conducted, distance-teaching encompassed only some of the disciplines taught at the teachers-training college and so other disciplines were not studied. The research was qualitative, and although its credibility was high because of the use of triangulation, reservations must be made with regard to their generalisability since it was situated in a particular field and time.

With regard to the research procedure and the research tools, the researcher notes several limitations concerning the interviews and observations.

The influence of the interviewer on the production of data: despite her declared intention to produce the interviewees' stories as they experienced them, the interviewer herself had her own opinions, attitudes, values and feelings. These could influence the interaction during the interview and were liable to unconsciously impact on the interviewees and to guide their stories. There is a fear that the use of interviews might provide a platform for prejudices, and express interviewees' memory difficulties that might cause inaccuracies and often reflect the interviewer's views. In other words the interviewee might express what the interviewer wanted to hear.

An additional limitation regarding the observations was that the very presence of the researcher during the staff meetings may have led the participants to alter their oral contributions to the meeting.

Yet another limitation stems from the researcher's status in the research. The researcher was employed in the college where the research took place. Respondents may have feared exposure by an 'inside' researcher who was known to and a colleague of the college staff. Additionally the interpretation of the study may well have been influenced by the prior or other knowledge that the researcher possessed.

Epilogue

With the completion of my research, I understood to what extent it had contributed to my personal development. It brought change into my life and a transformation in my intellectual thinking. Due to this study, I was exposed to many other researches, and many new concepts and perceptions. The, quality and content of my reading and the time I devoted to it expanded. This research experience granted me the confidence to discuss issues that I had previously avoided and enabled me to make the acquaintance of new colleagues and a wide range of people with an interest in and opinion regarding the studied issues.

In practice, with the completion of the research I continue to teach distance-teaching and to support veteran and novice teacher-educators in this field from the theoretical, pedagogic, technological and practical aspects. In the coming academic year I have been asked to head the Unit for Computerised Teaching Environments at the Mofet Institute and to mentor college teacher-educators in Israel in the transition process and the acquisition of suitable teaching modes for the innovative pedagogy of distance-teaching and learning.

The research findings have led the college, in which it was conducted, to renew their thinking on these issues and engender changes. They have included the subject of distance-teaching in their 'agenda' and devoted time for thinking and dialogue concerning issues which, according to my findings, remain unanswered. The college has even initiated the writing of a status report to define a distance-teaching course.

The findings of my research, that I presented at international conferences (Bar-Tal, 2007, 2008), engendered much excitement for me and professional interest among my professional colleagues.

My long sojourn in the research 'field' empowered my ability to comprehend and to investigate. Additionally the research helped me to see things that I had not seen before. I assume that my acquaintance with and work in this field threw additional light on the findings that emerged from the research and

provided an additional dimension to the interpretation that I was able to give to things. However, these processes engendered much ethical deliberation and questions stemming from the research and I became aware of ethical problems in both my personal and professional lives. This quest led me to devote a special chapter to the issue of ethics.

Finally, I have a wish. Usually the knowledge that teachers create in their work does not become common knowledge, and is not shared with colleagues. 'Knowledge in action' that is accumulated by professional teachers cannot always be revealed. The teachers' actions testify to their possession of knowledge, but this cannot be verbally expressed. This knowledge is known as the teachers' implicit theory' and unconventional means must be employed in order to bring them to light (Schon, 1983). It is my hope that my thesis will allow this knowledge to be shared and transmitted to many others.

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APPENDIX IA

THE STATUS OF TEACHER-TRAINING

Already, at the start of the 20th century, Dewey (1904) envisioned the development of teacher training in a special academic institution which would grant a first degree. He called for preparation for this process by a change in the contents used in training and a change in the methods that would transform training from a practical apprenticeship into training that linked practice with theory. His aim was to expose student-teachers to philosophical, educational and historic meanings of the teacher and educator's work and to create a framework in which they would acquire knowledge and skills through investigation. The process of institutionalisation of teacher-training in the 20th century was influenced to a large extent by the far-reaching transformations that took place in the educational systems throughout the world, following changes in attitudes and approaches concerning the role of education and its accessibility. The proportion of those who studied in universities and other higher education institutions grew by tens and even hundreds of percent, especially after the Second World War (Neave, 1992; 1995; Rothblatt, 1997). However, in most Western states teacher-training was subject to severe criticism and was denounced as an ineffective preparation for the teachers' role. Defective teacher-training is seen as a principal cause of the ills of education (Johnson, 1999) and there is broad public support for the opinion that teacher-training is the way to improve the school's level of quality (Rose & Gallup, 2000).

Mackey (1989) claimed that the teacher-training schools are considered to be the Cinderella of the academic institutions: only suffered by her academic sisters because of the work that they perform: teacher-training. As noted, it was only a century ago that Dewey (1904) suggested that pedagogy should be recognised as a university discipline and indeed the discipline of pedagogy found its place in universities relatively late (Erich, 1998).

For many years, teacher-training institutes were not seen as part of the higher education system but rather as part of the post-secondary education system, including professional training that did not lead to an academic degree. This contrasted with 'theoretical' training that according to Ben-David (1986) constitutes the very heart of the university. In addition, in many world states, these institutions suffered from low status and an inferior professional, institutional image (Ducharme, 1993).

This low status of teacher-training was one of the factors that led the Ministry of Education and the Higher Education Authority to suggest academic training for teaching, by opening study streams that would grant graduates a first academic degree in teaching (Kfir et al., 1995). This 'academisation' process may improve the image of teacher-training institutions, who have changed their title to become 'colleges of training for teaching staff' instead of 'teaching seminars'. Indeed in order to assimilate their new status among the academic institutions these colleges were required to create a new institutional image, so that they would no longer provide post-secondary vocational education but instead would emphasise academic training, similar to the training provided by other academic institutions.

Today in Israel, two central examples of teacher-training have become established: (1) The model of colleges of education, combining studies in the relevant academic disciplines with pedagogic and didactic teaching studies. Studies last for four years, leading to the degree of B.Ed. (2) The linear university model, separating disciplinary knowledge from teacher-training (Guri-Rosenblit, 2004). Studies last for three years towards a B.A. degree, followed by two years studies (which can begin simultaneously with third year degree studies) for a teaching certificate.

Training Teacher-Educators for their Roles

Very few of the teacher-training programmes relate to the training of teacher-educators for their role. In training programmes in the USA, especially in the universities, many of those dealing with teacher-training are not regular members of the faculty; they may be engaged part-time or temporarily in this field, or are auxiliary staff. Academic research and the professional literature tend to ignore these personnel (Cochran-Smith, 2003). Lainer & Little (1986) claimed that in order to work in teacher-training there is no need for a particular body of knowledge or for specific teaching methods. In contrast, Cochran-Smith (2003) indicated that a broader response is necessary to the question: who can be called teacher-educators? The research literature (Cochran-Smith, 1991; 1995; 1999) severely criticises the teacher-educators' low level of research ability, and their non-academic consideration of their role.

Duchame (1985) claimed that improvement of teacher-training academic activity and enhancement of its public image will only occur if teacher-training appears to be committed to scholarship and research. Duchame (1993) and Lorite (1975) noted that teachers became teacher-educators because of the following motivations: restricted options that were open for them, easy entry into the profession, models of teachers whom they had met in the past, influence of their families and random chance. They gave one or more of three reasons for their transfer from teaching in a school to teaching in teacher-training institutions: lack of opportunities for promotion in the school, a sense of isolation and a lack of time for thinking and planning.

A comprehensive study by Oshrat (1995) in Israel reported that the characteristics of the teacher-trainers' work, training and advancement differ from those of the general teacher population in the following ways (Oshrat, 1995):

1. Teacher-trainers are professionals required to have high-level degrees in their disciplines and required to comply with high standards of teaching skills. The need to respond to these two demands is specific to the college teacher-educators. In contrast, teachers in the universities have similar work to the college teachers, but they are not tested with regard to their teaching skills.
2. Teacher-trainers arrive at their occupation via different paths. Some of them have grown up from the 'field', meaning that they began as teachers or nursery teachers and for different reasons, such as their excellence in instructing teachers or progress in studies for higher degrees, they transferred or advanced to the role of teacher-trainers. These teacher-educators have teaching certificates and good teaching skills, but, they were actually trained as teachers for young pupils while in practice, in their college work, they teach adult students. Thus there is a certain gap between their training for teaching and the reality in which they function, that sometimes causes difficulty in their work.

3. Some of the teacher-trainers work in a teaching reality that is completely different from the reality in which they were trained, in other words their experience working with a low socio-economic population, tough pupils or young pupils does not only fail to train them for their work in the college, but even often requires processes of withdrawal from and extinction of teaching methods which they have used in the past.
4. The present work of most teacher-educators is not the first job in their professional career. For many, this is to a large extent, a second career, after they have worked in various settings in the school education system. They need to change their orientation, in one or more areas of their activity: from the nursery and school education field to academia, from teaching young people to teaching adults, from teaching to guidance and mentoring. Their present occupation to a large extent expresses their success in their previous settings and serves as a channel for their professional advancement.

Additionally, in order to teach in schools, teachers are required to acquire appropriate techniques and skills during several years of theoretical learning and practical guidance by experienced teachers, within the framework of teacher-training colleges and teacher-training programmes and practical 'mentoring' settings. In contrast, some teacher-trainers especially those who teach specific disciplines were never trained to teach at all, since they grew out of the academic world so that their teaching skills were often minimal. The need to face students with /n orientation for varied teaching methods is often liable to create difficulties and frustration for both sides. Even teacher-educators who had previously taught in schools found that their entry into the college was undirected, undefined, lacked guidance, supervision and instruction. The process of socialisation to their work and to the college was based on good advice that they drew from random friends, who had undergone a similar process in the past and based their conclusions on trial and error. In other words the college lacked a framework that would supervise teacher-educators and help them when they entered the role. This was in addition to the fact that there is no formal system for the training of college teacher-educators.

The teacher-educator population in Israel is a relatively mature population. The average age is 49 years old and the range of ages varies from 33-72 years old. Since there have been continual reductions and dismissals in the past decade and there is almost no influx of new teaching staff, an increase in the ages of these teacher-educators can be noticed (Goodlad, 1990; Hativa, 1997; Oshrat, 1995).

The status of teacher-educators depends on the teacher-educators self-perception: as lecturers, academic professors, teacher-trainers, researchers or practitioners whose specialisation is an orientation to schools, guiding the student-teachers in their practicum (Backus, 1987). Reynolds (1995) reviewed 225 teacher-educators from universities and colleges throughout the USA and found that the teacher-educators believed that their connection with schools lowered their status in the campus.

In Israel, according to Guri-Rosenblit (2004) the status of the teacher-training institutions largely determines teacher-educators' prestige in comparison with other professions and occupations. The great variety between the different teacher-training institutes shows that the roles of teacher-trainers were and are not sufficiently clear. They differ from the roles of academic lecturers whose teaching has no immediate professional affiliation (Avdor, 2001). The spread of the higher education system in recent decades in most world states and in Israel has led to the creation of clear strata of academic institutions graded from high to low status (Teichler, 1988). This

stratification stems both from the distinction created between the established veteran institutions and the new institutions, and from the academic upgrading of institutions that were previously part of the post-secondary vocational educational system. In Israel, this is expressed by the distinction created by the Higher Education Authority between the research universities as 'first class' institutions and the academic colleges, colleges of education and other institutions who grant academic degrees outside the universities that are classified as 'second-class' institutions (Yogev, 2000; Ayalon and Yogev, 2002).

Harrison & McKeon (2008) identified early delaying factors that delay the successful transfer of school teachers to teaching in academic/ training institutions including: a minority of role-holders able to serve as models for the performance of the function, reliance on learning through trial and error, lack of a personal vision concerning the way in which the role should be developed, low self-confidence relating to central aspects of the work, inappropriate assimilation courses, poor systems of mentorship and support, few opportunities for planning, teaching and writing or team discussions. Factors that delay the construction of a new academic identity include the level of expertise of the new teacher-educator and the degree of cohesion and status at the workplace. In different aspects of their roles and areas of responsibility, teaching and management, the new teacher-educators are expected to act as experts at their new workplace, something that creates a not insignificant emotional storm for some of them (Trowler and Knight, 2000).

APPENDIX IB

DISTANCE-LEARNING

Technological progress has not only brought with it a new type of learner whose experience includes effective performance of the task and prevention of mistakes, but also the need to supply an experience that is suited to this new person (Dede, 2005; Downes, 2005; Thompson, 2007). E-learning is not just another tool. It will change how we experience and view learning (Garrison & Anderson, 2004, p. 6).

On-line learning is defined as learning that takes place on the Internet using vocal, textual and video means, and it is characterised by physical and often temporal separation between the teacher and learner (Kurtz et al., 2006). The integration of the computer in teaching contributes to high levels of learning and thinking, structuring knowledge, improving meta-cognitive strategies and promoting advanced literacy skills (Papert, 1980; Perkins, 1985; Gordon, 1996; APA, 1997; Moller, 1998; Huffaker, 2003; Huffaker & Calvert, 2003). Students are required to take a more active role than in the past in reading articles. They are required to present their ideas before their peers in an on-line course, to discuss them and to form arguments; they cannot be passive as in a regular face-to-face course. They need to have an opinion, analyse arguments and know how to reduce irrelevant knowledge; meaning they need to know how to collect data and findings in order to affirm their arguments (Nash, 2007). This learning mode leads the students to participate more actively than in a face-to-face course (Hillman, 1999). Alfred et al. (2007) indicate that the learners in distance-learning have stronger internal motivation in comparison with learners in face-to-face learning on campus. The dimensions that point to stronger motivation in distance-learning are expressed in an aspiration to broaden knowledge, a desire to perform things and a desire to experiment.

Learners are granted personal consideration by the knowledge suppliers, who are not physically close to them but provide first-hand knowledge (Berge & Collins, 1995). Effective learning takes place in a learning environment in which the learners have easy access to varied knowledge and can choose from this the knowledge, what is relevant to their disposition, inclinations and curiosity. This enables them to structure knowledge independently (Olson, 2007). The assumption is that the use of digital knowledge technology will develop high-order thinking skills (Henderson & Nash, 2007).

Nevertheless, from the research on this issue, it seems that simply working on the computer by itself will not advance higher levels of thinking and learning among learners (Healy, 1998; Cordes & Miller, 2000; Nir-Gal & Klein, 2004). Thus too, on-line learning does not provide an automatic contribution and its effectiveness depends on the skills of the on-line teacher and activities of the course learner (Gabrys & Britt, 2000). It is not the technology itself but the manner in which it is implemented by the teacher that determines the effectiveness of learning (Volery, 2001). It is important to remember that a course in distant teaching is not suitable for every learner (Galland, 2002).

APPENDIX IC

DEFINITIONS AND MODELS OF DISTANCE TEACHING

The first definition of 'instructional technology' is that of the Association for Educational Communications Technology (AECT)

The theory and practice of design, development, utilization, management, and evaluation of [technological] processes and resources for learning (Seels & Richey 1994, p.129).

Initially, distance-learning was defined as learning without boundaries of time and place (Moore, 1993), but over the years a variety of additional terms were coined, that define distance-learning in a general way, for example: Web-Based Instruction (WBI), Web-Based Training (WBT), Internet-Based Training (IBT), Distributed Learning (DL), Advanced Distributed Learning (ADL), Distance-learning (DL), Online Learning (OL), Mobile Learning (or m-Learning), or Nomadic Learning, Remote Learning, Off-site Learning or Distance Education (DE), Computer Mediated Communication (CMC), Web Based Learning (WBL), Distributed Learning, Online Learning or E-learning.

As a rule, these terms describe an environment that enables access to data reservoirs and to people through a variety of levels and communications media, on the computer. Most of the definitions for distance-learning relate to a number of aspects: separation (in location and sometimes in time) between the teacher and the learner, in most learning processes or all of them; use of educational media to create a connection between the instructor and the learner; existence of bi-directional communication between the instructor and learner; learning on the learner and planning ahead and organisation of a support system for the learner (Bannan & Milheim, 1977; Holmberg, 1977; 1986; Keegan, 1986).

Virtual courses can be classified according to different criteria, such as the extent to which the computer-mediated environment is integrated into the course (Bonk et al., 1999; Barron, 1998); or according to the extent of the teacher's involvement in the process. Hannum (2000) presented a graded model that relates to the extent of distribution of the course's learning material on the net and the extent of communication that exists between the lecturer and learners.

In contrast, Rosenthal (2002) suggested a three-dimensional model that revolves on three central axes:

- Interaction – to what extent does an interaction exist between the lecturer and the learners and between the learners themselves?
- Synchronisation – does the learning take place at a particular time on-line or according to flexible time?
- Linear – Is the structure of contents organised in a particular order, or is there an elective choice of order for learning the chapters.

'Virtual Classroom' model – this is an especially rich model. Hilz (1993) defines a virtual classroom as an environment that uses computer-mediated resources with the goal of facilitating Collaborative Learning between the learners, between learners and lecturers and between the class and the broadest possible academic and non-academic communities.

APPENDIX ID

READING AND WRITING INTERNET LANGUAGE

The Internet language is completely different from written printed language: firstly, it is founded on Hypertext

Hypertext is a multidimensional and multidirectional form of writing that enables the presentation of knowledge in an associative way rather than the linear manner, as is done in writing.. Hypertext enables learners to learn in a form, to broaden or focus their learning (Killion, 2002). In Judaism this form of writing was practised hundreds of years ago in the writing of the Talmud. In the modern era the idea of Hypertext was first consolidated in 1945 by Bush (1945).

The morphology of the net is expressed not only in the technological structure but also in the conceptual and content structure, and influences the form of writing, the presentation of the data, and the manner of reading and absorption (Lowe and Hall, 1998; Man, 2002; Hang, 2002). The sequence of reading is not predetermined and is unknown to the writer. The concept of 'progress' loses its original meaning in an environment that is not linear. The text contains many layers some of which are invisible and users are only exposed to the information that occupies them at a given moment. The rest of the information is hidden but accessible, and can be reached easily according to choice through the referrals. This means that digital text that correctly utilises its characteristics constitutes WYSIWYN (What You See is What You Need) (Rotem & Peled, 2008).

Readers do not only steer their course through the reading journey, but they are also likely to introduce additions of others or of their own as creators.

Reading Hypertext constructs an intertextuality of a different kind than that which it had during its growth (Allen, 2000). This difference means that the reader needs to employ knowledgeable-critical skills when retrieving the knowledge (Hang, 2002). The computer-mediated environment offers a different format of reading, and a multi-media style in which the 'text' is not only composed of words but also from visual objects, voices and films (Hypermedia) necessitating reading and writing of another sort and requiring the establishment of a new agreement between the writer and the reader.

Internet writing requires the formation of new rules for the term 'writing' and expertise founded on different contents (School of Literature, Communication and Culture, 2006). The role of the reader on the Internet changes substantially and the reader becomes an active factor and engenders the creation itself. The Internet enables the readers to also be a 'Reader-Reactors' or 'Reader-Remarker-Critics', and the fact that they are able to propagate their reactions broadens the significance of the term 'reading'. Thus the use of Hypertext that enables non-linear learning, as also the language in which the content is written and its presentation from different aspects, all facilitate the assimilation of the content among the learners and encourage an interaction (Spiro et al., 2000). The most significant pedagogic advantage for the learner stemming from the use of an on-line environment is that it provides the learner with a means for effective organisation and expression of the learner's personal needs using digital text to focus the learner on two central aspects (Barzilai-Nahon & Sheizaf, 2005; Hargittai, 2003):

1. Access to knowledge and participation in a community – these turn the learning process into intelligent retrieval, including expert sources of information and written sources which have been written on the net, instead of the tedious collection and ineffective collection of hard data and knowledge. This

accompanies personal organisation and consolidation of a personal identity in the on-line space while cooperating with others. Thus a digital gap is formed if there is a lack of the significant advantage of an on-line environment or reduction of everything associated with effective organisation and retrieval of personal knowledge.

2. Retrieval of information, storing and organisation and filing for immediate use in any context and at any time as an alternative to memory, to notebooks, memos, file cabinets and cupboard drawers. However, the teacher needs to review materials from time to time in order to verify that they comply with standards. It is important to continually update materials (Lynch, 2002). Lynch (2002) recommends that the teacher use technology in order to be up-to-date by creating a personalised start page, using a good search engine, a good on-line dictionary, subscribing to a newsletter and Listserv companies and joining a newsgroup with access to on-line journals. In contrast, Spencer (2006) notes that one of the reasons for the failure of virtual courses is that students find it difficult to cope with the reading of digital and hypermedia texts.

APPENDIX IE

TELECOMMUNICATIONS AND DISTANCE-TEACHING TOOLS

Given the rapid and continuing development of digital technology in the modern era, people are required to use a growing variety of technical, cognitive and sociological skills to perform tasks and solve problems in a digital environment. These skills are called 'digital literacy' in the literature (Lanham, 1995; Gilster, 1997; Inoue, Naito & Koshizuka, 1997; Pool, 1997).

Research studies (Bonk, Wisher & Lee, 2003; Cuban, Kirkpatrick & Pexk, 2001) have examined the reasons for the minimal success in assimilating technology in teaching in recent years, claiming that it indicates that the main problems in on-line teaching stem from the difficulties of students and teachers to make effective use of on-line teaching courses and the fact that the learning materials available on the net have not been developed especially with regard to on-line learning. These courses do not use the technological environment wisely and are not designed in a manner that encourages learning (Shemla & Nachmias, 2006).

Computer-mediated communications have engendered the creation of new communication forms, by minimising the mediating time for creation of the connection and relieving the communicators from the limitation of place and sometimes even time needed to form the connection.

Communication in each of the formats – synchronic and a-synchronic – creates regular recording, it is possible to go back and survey things that were written or said, to cogitate again on a particular attitude or opinion, to again study a chain conversation, and to link previous thoughts to present thoughts. Computer-mediated communications are superior to any other educational technology such as video-film, since they enable the development of personal relations (Davie & Wels, 1991), however in order to exploit them several preliminary and in-process actions must be performed. In virtual communications as in face-to-face learning, the following standards should be maintained: quality of teaching experience, quality of content and flexibility, flexibility in time of support and follow-up, reinforcement for the networks, use of technology, technical support, providing a location for learning, development of a professional staff and learning programmes (Killion, 2002).

The existence of communications during the learning process in a distance-teaching course promotes collaborative learning (Barron, 1998), and contributes to the establishment of trust relations between the students, and between the lecturer and the students. Davie & Wells (1991) compare a-synchronic communications to 'the skeleton and muscles' of the course, while synchronic communications constitute the core of the course.

Morris & Organ (1996) see the Internet as a system of mass communications and divide the creators and communities on the Internet according to four categories:

1. A-synchronic communications – one-to-one, such as e-mail.
2. A-synchronic communications – many-to-many, such as USnet, Listserve and electronic notice-boards that necessitate the recipient's registration for the service or connection to software in order to receive access to messages concerning a particular issue or issues.
3. Synchronic communications that may be one-to-one, one-to-others, or one-to-many and may be organised around a particular issue, construction of objects or role play.

4. A-synchronic communications characterised generally by the need of the recipient to search for a site in order to reach knowledge that may involve sender-recipient relations of many-to-one, one-to-one or one-to-many.

In a-synchronic communications it is possible to communicate with others independent of location and time of the sending of the messages so that the communications can take place from any physical space to this virtual space.

The learner mainly conducts an interaction with contents that exist in the hypertextual structure or are linked to different Internet sites, and can thus choose the time and location of learning that are convenient (Oren, 2000; Lapadat, 2002).

On-line discussion enables a-synchronic participation in joint reflection, in ideas, thoughts and questions. In a focused discussion the participants and organiser have time to prepare their comments and reactions. The discussion develops over time and progresses in cycles: the participants are given opportunities for additional thinking about their ideas and the ideas of others; participants can contribute to the discussion according to their own pace, each contribution is recorded and accessible to others; an on-line discussion can be more reflective in comparison to a face-to-face encounter in a seminar. In such a discussion more reactions will develop because the participant learners have more time for reflection and in-depth reaction (Lapadat, 2002). The protocol of each discussion is automatically saved so that the participants can always return to it in order to continue the discussion (Treacy et al., 2002). A-synchronic format is not limited in time, so that slower students also have the opportunity to participate in the discussion (Davie & Wells, 1991).

In a synchronised learning system communication occurs in real-time at different virtual levels, from simple text writing, integration of graphic components, discourse in a three-dimensional environment, use of video and sound. Synchronic communication relieves the communicator from the restriction of location but obliges them to cooperate in time. When writing accompanies a communicative process, a new communication dimension is created that enables the communicator time for thinking in order to write, slower than speaking, together with the possibility of reading and revising the sent message (Oren, 2000; Goldstein, 2001). The advantage of synchronic communications is that the learners receive immediate feedback.

However synchronic communications also involve difficulties and disadvantages. Students are dependent on accessibility of the lecturer at a defined point in time (Mabrito, 2005). There is more pressure on participants to react quickly, when the messages/ reactions are linear and superficial (Lapadat, 2002). As a result, interactions in real-time (synchronised) are not appropriate for learning situations in which it is necessary to transmit and teach complex concepts that need long and more profound explanations. In addition, audio-video conferences, like other synchronised media, have allotted air-time, and so they are liable to cut off slow students while they express their ideas (Davie & Wells, 1991).

In order to overcome some of these blocks and difficulties the teacher's role is to help the learners become acquainted with the tools (Mabrito, 2005). Mabrito (2005) tried to adapt each of these learning channels to the cognitive abilities of the students in an on-line course. When the studied subject is very complex, he used a-synchronic communications, and when he needed to transmit knowledge and regular contents, he used more synchronic communication, such as chats or transmission of contents in real-time.

In an on-line environment teachers need to use less direct control over learners. The learners assimilating within the on-line environment are not only influenced by the lecturer's teaching but also by social and cognitive interactions and by curiosity. Technology enables learners to reveal their abilities, going beyond what was originally planned by the computer-mediated tool (Schrader, 2008). In the context of on-line teaching, technology does not have a status of its own, but it is an indivisible part of pedagogy and studied worlds of content (Law, Pelgrum & Plomb, 2008).

The Learning Forum

The learning forum on the net is an a-synchronic tool that offers an encounter between learners who have a common interest or studied subject, to focus on this issue and serves as a free platform on which they can present their opinions. This is written discussion that takes place through texts: 'writing that speaks'. The sender writes the message and the recipient reads it. It has an informal, dynamic and direct composition (Birenbaum & Feldman, 2002). The forum discussion has no limitation of time and location. Each participant can join in at a convenient time wherever they are, in contrast to the traditional class that takes place in a defined time and place (Feenberg, 1989; Hara, Bonk & Angeli, 2000). The forum provides a place for students to send comments regarding the content and context of the course and the learning process (Brooks & Kopp, 1989; Chesebro & Bonsall, 1989; Adkins, 1991; Lindsey-North, 2000). Since the discussion is written it enables participants to read and pay attention to the messages, to think about and plan their reactions and to formulate them before sending them. The forum allows a space for expression by each learner, especially in cases where the learners want others to react to their words. In addition, the participants can return to reread messages, to gather bits of relevant information from the content, to assess and criticise the words of participants, while in a traditional class, learners who forgot to say something orally during their turn, miss the opportunity. Messages in the forum reflect the common knowledge that is produced by the contributions of all the participants in the discussion and this allows for more viewpoints than discussion in a regular classroom.

During the activity in the forum each participant can ask questions at any given time without waiting for a specified turn, as is accepted in face-to-face encounters. There is no need to request permission to participate, any participant can receive attention and offer attention to others (Mason, 1998; Salmon, 2004; Merryfield, 2001; Salant, 2004). However a-synchronic on-line discourse causes overload, because of the large amount of messages transmitted, both to the instructors and to the participants and it necessitates responsibility and self-discipline on the part of participants when participating (Birenbaum & Feldman, 2002).

Hiltz (1988) distinguished two forum models:

1. The mass model, in which the group discussion serves as a tool to transmit information from the instructor to a large group of learners.
2. A model directed to create a learning dialogue and interaction between peers and an instructor with a character of collaborative group learning. The 'conversation' occurs, free from the influences of the physical dimension (location, external appearance, speaking voice and accent etc.) and develops from the text components: ideas, style, structure and composition (Young, 1994).

E-Mail

E-mail is an a-synchronic tool that enables the transmission of textual and graphic mail between individuals or a pre-determined group while maintaining member lists, and serves as a learning tool in any location and at any time. It allows users to transmit messages simultaneously to a large list of people and enables reading, sorting and sending of files according to names registered in an address-book (Goldenberg, Outsen and Missed, 2002). In addition, according to Suler (1999) the 'psychological space' provided by e-mail creates a context and boundary in which human relationships can unfold.

From an educational aspect e-mail has a number of advantages: it is easy to communicate, enables large communities to exist for a certain time, contributing to professional development, good for people who have difficulty in the classroom, enables informal communication, maintains learning relations between people from different locations, provides the teacher with tools to examine products, add comments, and 'track changes'. E-mail enables summaries to be made, to tell each learner what was good or bad and to send comments (Lynch, 2002; Goldenberg, Outsen and Missed, 2002). For those who have slow or delayed reactions, the teacher can send a private e-mail to investigate the participant's needs and to provide suitable encouragement (Treacy et al., 2002).

But use of e-mail instead of face-to-face sessions with students creates difficulty for students who need swift answers because of their dependence on a compulsory time framework. To solve these difficulties, Marbrito (2005) suggested 'the 12-hour rule' that he used in on-line courses. According to this rule, he answered all those who write mail within 12 hours from the moment the mail was received. All this, in principle, is provided throughout the week. In peak hours, such as the beginning of a semester and several days before the students need to present exercises this rule becomes a clearer commitment. A more radical view was provided by Young (2000) who recommended inspecting e-mail three times a week, at least at the beginning of the course, and afterwards more infrequently.

Graphics and Multimedia

In order to overcome all the obstacles created by a lack of face-to-face interaction Lynch (2002) suggests the integration of graphics, sounds, and tones. This activity includes more use of the mouse; it needs thinking such as interpretative analysis. Graphics illustrate things (Killion, 2002). Multimedia enables a live presentation of a subject. It influences the way the course is managed to provide self-help and tools for self-assessment (University of Texas, 2004). The course resources can be further enriched with historical films or recordings of experts outside the course framework (Calandra, Barron & Thompson-Sellers, 2008).

Interactive multimedia is organised digital data that includes text, graphics, still-life pictures, photographs, animation, sounds and video-clips presented on a user-friendly interface. It enables the users to surf as they wish in order to find and view information (Dyrli & Kinnaman, 1995; Galbreath, 1994) and increases the amount and quality of information that the computer and user exchange between them (Barker, 1994). Among the advantages of the use of multimedia for learning purposes are the interactive nature of the user interface and the flexibility of knowledge acquisition from the timing viewpoint, with regard to the learning rate, accessibility and choice of learning environment (Chen, 1994).

Nevertheless, multimedia has its own limitations, which are liable to influence the computer's work speed. Digital videos need a huge volume of computer memory. The computer needs to compress and then open the video files in order to process the movement accompanied by graphics and text. Often in the absence of a suitable hardware solution, the speed of the computer-processing decreases to the extent that it seriously harms the video or animation quality (Chen, 1994).

Another problem that makes it difficult to develop the multimedia interactive software for the purposes of higher education is the fact that the experts, the teachers and publishers who are knowledgeable with regard to the learning material are unable to programme the software, while many programmers are not so knowledgeable concerning teaching theory and methods (Kalmbach, 1994). Additionally, the research literature shows (Billings et al., 2001; Reisetter et al., 2004) that students were less impressed by the graphic and visual elements that broadened the course site and more by the simplicity, clarity and utility of the site.

Presentations

A presentation is an a-synchronic communication means and a tool to represent knowledge. It constitutes a facilitating tool for teachers and learners to present knowledge in different ways (Gomez et al., 2008). A multimedia presentation is a system of slides/ screens prepared with multimedia tools such as *Power-Point*, *Astound*, *Active*. The presentation slides can show information with different media: text, pictures, films, animations, sounds, linear or non-linear, while creating links between the slides or between the slides and other computer applications, to the Internet to forums etc. It is possible to categorise the application of the slides, within the software framework, (Blanchard, Lewis & Crossman, 1995; Lachs & William, 1998; Lynch, 2002) in two manners:

1. Viewing or using a 'ready to use' multimedia presentation prepared by others.
2. Self-production of a presentation ('construct your own') using the computer as a 'content free' tool.

Construction of a multimedia presentation is used as communication with others and helps the learner to construct a network of meanings. The 'external' communications and the 'internal' mind are supposed to reciprocally help each other to form, while the multimedia serve here as a thinking tool and as a tool for construction of knowledge. The constructivist approach to education assumes that good learning is produced by the learner's independent construction of knowledge and building a multimedia presentation enables this to be done in a unique way (Salomon, 2000).

The presentation can be seen as a 'visual map' that enables learners to produce a product that expresses their own understandings instead of just reiterating in different ways knowledge that others, usually teachers, have presented to them. Lachs & William (1998) label the tools that facilitate a self-production 'empowerment of the learner'.

The ability to present information in a wide-branching, multidirectional way using different links to an issue, allow a distinction to be drawn between basic knowledge and deep and detailed knowledge (Riel, 1994). These technologies can produce an 'intellectual partnership' (Salomon, 1996) between the individual learner and the intelligent and sophisticated tools, especially facilitating learning as a social inter-personal process, enabling collaboration between a couple/ team, where the emphasis

is diverted from the centrality of the teacher and formal achievements to learning based on processes and interactions between members of a community and between them and the computer (Pea, 1993; Mercer, 1993; Kozma, 1994).

The development of the awareness that the presentation will have recipients, increases the producers' responsibility both with regard to the areas of the knowledge – its exactness, trustworthiness and validity and also the ways in which it is presented. This process means that the producers/ students need to be aware of others. Imel (1992) claims that in order for the learner to reflect on the learning and production processes, the learner needs to interact with an external recipient/ observer through whom the learner can identify assumptions, actions, emotions and thoughts that operated in the learning process. In advanced stages it is possible that the producers can internalise an imaginary observer that will influence their learning processes and production.

APPENDIX IIA

LEARNING STYLES

The term 'learning styles' relates to individual consistent differences in the manner that people acquire new knowledge, process it and organise it. Learning styles are sets of personal qualities that make teaching methods effective for some people and ineffective for others. Learning styles and strategies for independent learning are influenced by the learner's background and acquired learning habits (Jones & Devenport, 1996; Prudie & Hattie, 1996). Studies have found that students prefer teaching approaches that fit their preferred learning styles (Dunn et al., 1989; Silver, String & Pereni, 1997; Hativa & Birenbaum, 2000).

There are several categorised models of learning styles relating to the manner of absorption and processing of data, to the source of motivation and social and personal aspects (Dunn & Dunn, 1975; Gregorc, 1982; Kolb, 1984; Myers & Myers, 1987; Felder & Silverman, 1993). Kolb (1984) distinguished four styles of learning:

1. Diverger: need to see the knowledge in its entirety before they see the parts. They prefer to work alone and think alone and slowly about the new knowledge. They try to compose the whole picture before beginning to assemble or operate a new tool at home. They need time for thought about the material in order to organise their perceptions and planning.
2. Converger: plan their learning in a more methodical and interesting way with theories rather than practical implementation. They also read the instructions and comply with them fastidiously. They first need details in order to construct the overall picture and they construct the new tool after reading instructions.
3. Accomodator: they need to try everything. They plan systematically but prefer to try out things in order to discover how they work. When they purchase a new tool they do not read the instructions but immediately try to assemble the tool in order to see how it works.
4. Assimilator: learn intuitively, through trial and error. They have to try things actively to learn and need first to see the whole before going on to its parts.

Felder & Silverman (1993) categorised four dimensions of learning:

1. PROCESSING: The active-reflective dimension relates to preferred data-processing methods. Active learners tend to understand and keep knowledge by actively experimenting with the subject under discussion, through the discussion of the subject, applying it or explaining it to others. They therefore prefer to work in groups. Reflective learners prefer first to think about the subject quietly and they therefore prefer to work alone.
2. ORGANISATION: The purposeful-curious or inductive-deductive dimensions relates to a type of orientation. Purposeful learners (practical orientation for work and objectives, connected to the world of reality) are contrasted with curious learners (orientation to theories and meanings). Purposeful learners tend to process and maintain knowledge by learning and memorising the details of the knowledge. They tend to be patient with abundant details and they are good at memorising facts and experimenting in laboratories. They feel confident when they are solving problems through a structured method and do not 'endanger' themselves with risks or surprises. Curious learners are disposed to use abstract thinking. They process and maintain knowledge through research and discovery. They like innovations, preferring to reveal associations between new facts by themselves, and shy away from

memorisation and routine calculations. They are likely to understand new perceptions better and to feel more comfortable than the purposeful learners with abstractions and mathematical formulas.

3. **UNDERSTANDING:** a sequential-global dimension relates to the manner of progress towards understanding. In both styles in this dimension, learners see the complete picture at the end of the process, but the way in which they progress towards understanding differs. The sequential learning style is characterised by learners who tend to develop their understanding in successive, consecutive steps, in a linear and logical manner in contrast to the global learning style that characterises those who learn in large leaps, who do not see the sequence at the beginning of the learning of a subject but absorb it holistically in a random manner.
4. **INPUT:** The visual-verbal dimension relates to the preferred way of presentation/absorption. A visual style characterises learners who remember and learn better when the knowledge is presented visually: in pictures, in diagrams and films as opposed to a verbal presentation: in lectures and verbal explanations.

Recently, researchers in the field of psychology (Pashler et al., 2009) have asserted that most of the articles written until now on learning styles lack research validity. Most of them have not developed a valid research system that could prove basic assumptions concerning the existence and adaptation of significant learning styles in teaching and learning processes. Following a meta-analysis of the articles written until now on the subject of learning styles, the researchers doubt whether there are such significant differences between learners in approach and inclination. Since there is a lack of empirical proof for the existence of learning styles or their substantial influence, psychological researchers remain dubious about the importance that educators attribute to the issue of learning styles in learning.

Characteristics of the Adult Learner

Many of the considerations that are relevant to adult teaching differ in a significant way from the considerations involved in teaching children. In order to assimilate these differences to the spirit of teaching in the present epoch, a new term 'androgogy' was coined (Morland & Bivens, 2004). The following are the distinct characteristics of adult learners in contrast to child learners as listed by several scholars:

1. Bring a rich reservoir of knowledge and experience that can serve as a resource for learning (Lynch, 2002).
2. Possess established values (Lynch, 2002).
3. Expect to be treated as mature, thinking individuals and wish to be part of a community of like-minded learners (Knowles, 1984a; 1984b; Lynch, 2002).
4. They are highly motivated to learn (Merriam & Caffarella, 1999).
5. Want to feel self-directed, with opportunities for review or more in-depth research as desired (Knowles, 1984a; 1984b; Carlson, 1989; Atherton, 2003; Lynch, 2002).
6. Take a problem-centered approach to learning and desire application to the real-world environment in which they live/work (Knowles, 1984a; 1984b; Lynch, 2002).
7. Express less interest in survey (theory) types of courses and more interest in problem-solving and product creation (Knowles, 1984a; 1984b; Merriam & Caffarella, 1999; Lynch, 2002).

8. Exhibit great variation in learning styles (individual differences increase with age, as does the desire to use a variety of styles to comprehend) (Lynch, 2002).
9. Accept responsibility for their own learning if the subject is perceived as timely and appropriate (Lynch, 2002).
10. Need to know why they are required to learn particular things (Knowles, 1984a; 1984b).

In their book *Telling ain't training*, Stolovitch & Keeps (2002) summarise the principles for adult education indicated by Knowles (1984a; 1984b): training needs to relate clearly to the needs of learners so that they will be willing to learn, taking their life experience into consideration, involving learners in planning the programme, and indicating the connection between the training and implementation of what is learnt. Thus, different courses and learning streams that are offered to adults must reveal sensitivity to the adults' desires and special characteristics.

In more detail, Lynch (2002) lists the following teaching strategies for adult learners, also including concepts delineated by Knowles:

1. Use your students as resources for yourself and for other students
2. Take time to clarify student expectations of the course
3. Treat questions and comments with respect
4. Engage students in designing the learning process
5. Show immediately how new knowledge or skills can be applied to current problems or situations
6. Focus on theories and concepts within the context of their applications to relevant problems Use a variety of teaching materials and methods to take into account differences in style, time, types, and pace of learning
7. Establish peer study groups and incorporate peer reviews to encourage students to discuss their work

Since there is no one learning theory that suits adult learners (Frey & Alman, 2003), Cercone (2008) notes that the distance-learning course needs to be adapted to the needs of adult learners and based on self-directed learning, experiential learning and transformational learning. Because most adults learnt in traditional classes and were used to passive learning, both students and teachers need to adopt new teaching and learning methods suitable for the new media and based on the following characteristics, which overlap with some of the characteristics indicated by Knowles and Lynch:

1. Adults need to be actively involved in the learning process
2. Adults need scaffolding to be provided by the instructor. Scaffolding should promote self-reliance, and allow learners to perform activities they were unable to perform without this support
3. Adults have a pre-existing learning history and will need support to work in the new learner-centred paradigm
4. Adults need the instructor acting as a facilitator
5. Adults need consideration of their prior experience. The instructor should acknowledge this experience. Adults need to connect new knowledge to past events.
6. Adults need to see the link between what they are learning and how it will apply to their lives. They want to apply their new knowledge immediately. They are problem-centred.

7. Adults need to feel that learning focuses on issues that directly concern them and want to know what they are going to learn, how the learning will be conducted, and why it is important. The course should be learner-centred as opposed to teacher-centred
8. Adults need to test their learning as they go along, rather than receive background theory
9. Adult learning requires a climate that is collaborative, respectful, mutual, and informal.
10. Adults need to self-reflect on the learning process and be given support for transformational learning
11. Adults need dialogue and social interaction must be provided. They need to collaborate with other students.

APPENDIX IIB

A PLATFORM AND SUPPORTIVE SOFTWARE USED IN DISTANCE-TEACHING

HighLearn

HighLearn is a technological platform that enables teaching institutions to implement system projects for learning and management of knowledge through an Internet network or the Intranet. All the activities in *HighLearn* are carried out within defined learning environments, while the system enables the sharing of knowledge and activities between different learning environments. It enables simultaneous operation of a large number of learning environments that include a large amount of contents and activities in a variety of learning methods and operation. Each learning environment stands on its own and allows the instructor and the participants to conduct learning activities, manage knowledge and to manage qualification. The knowledge reservoir of each environment includes rich and varied contents including data, presentations, pictures, video, questions, examinations etc. (Eitan Education Internet on-line site, 2003b).

Skype

Skype created a little piece of software that makes communicating with people around the world easy and fun. With Skype you can say hello or share a laugh with anyone, anywhere. And if both of you are on Skype, it's free (Skype on-line site, 2009).

Dickmeis and Biher (2005) noted several advantages of Skype in comparison to other communication tools that give it the most significant potential for e-learning on the net: Skype allows communication of different types (video, audio and chat – private or group, transmission of files) either simultaneously or periodically, the software and the communication are provided free and use simple equipment (microphone and camera), thus making it accessible to learners from educational institutions and from their homes.

Skype has a high degree of flexibility for different teaching needs: it is easy to move from an instructor's lecture to an 'organised' (providing turns to speak) or to a natural (microphones of all learners are open simultaneously) discussion, to go from a plenum discussion to a discussion in a number of groups where the instructor 'visits' each of the different groups.

Interwise

This software supports live and recorded sessions while transmitting voice, picture, video, text and slides simultaneously to an unlimited number of peripheral users (see Eitan on-line site, 2003b).

APPENDIX IIIA

THE RESEARCH FIELD

In any qualitative description the research must include descriptions of the cultural context in which the studied event takes place (Merriam, 1998). The contexts are important as the means to locate the action and understand the broader social and historic meanings of the phenomenon. The most problematic issue in creating a theoretical description is to decide on the correct combination and balance between descriptions and theoretical perceptions (Merriam, 1985; 1998).

The teacher-training college in which the research took place, was established in 1912, and is the most senior teacher-training college in Israel. It was the first college to train teachers in Hebrew. Innovation and originality were the outstanding features of the college. It led the process of academisation of teacher training and was the first college to receive full academic recognition for all training streams in 1982. It was also among the first colleges to receive official recognition to conduct courses for a second degree in 2003.

Among the colleges in Israel, this college has a good reputation and it is in high demand. It is located in Tel Aviv, the largest city in Israel. Most of the students are Jews, whose mother tongue is Hebrew and there is a minority of Arab students whose native tongue is Arabic. Among the Jewish population there are students who emigrated from the countries of the former USSR at different ages during their childhood and youth. There are a variety of study streams in accord with the age groups with which the students will eventually work: early childhood, primary school, secondary school and special education. Most predominant are the two main training streams, the first the stream for regular students most of whom are young in their twenties studying four year courses in education, primary education, a discipline and practical experience. The second is the retraining stream aimed at students with a first degree in another discipline who study for one or two years to receive a teaching diploma or teachers who are veterans in the education system who wish to supplement their studies towards a first academic degree. The ages of these students in the retraining unit is between 25-50. The retraining courses are integrated within the streams and specialisations and in part the students study regular studies and retraining together. Most of the college's student population are women. Two thousand students study in the college and the teaching staff numbers 400 staff members ranging from lecturers who teach a single course and whose main occupation and interest lies outside the college, to lecturers who have full-time tenure in the college for whom this is their sole place of work. Several hundreds of courses are conducted in the college each year.

The college vision as it appears in the institute's Internet site:

The college ... sees its uniqueness as a leading college that emphasises uncompromising academic excellence and quality of teaching, and believes in life-long learning. This path is founded on cultural assets, on universal and national values, on technological achievements and on the provision of a response for the changing needs of a pluralist multi-cultural society so that our

graduates develop community involvement and become critical and creative leaders, and are among society's leading figures (from the Internet site of the College – the site's address is not provided here for ethical reasons, since the researcher promised not to identify the college in the thesis).

The college is among the pioneers of computerisation in Israel. The computerisation coordinator has a doctor's degree in 'Integration of Technology in Education', and she has prompted the college management to promote this field and to enlist funds and to invest substantial budgets in order to implement this innovative field within teacher-training.

During the years 1996-2000 the '*Computerised Classrooms*' project took place within the college. The purpose of the project was to prepare teaching students to integrate technology in their learning and teaching. This step was generated by '*Tomorrow 98*' a project which was established to promote the assimilation of teaching with the help of advanced technology in the Israeli education system. At the beginning of each year of the project a group of first year students received lap-tops and supplementary courses in computer skills and computer applications in teaching. Some of the computerised class teachers studied a collection of courses combined with technology, in the education disciplines and in their specialisation discipline. At the beginning of 2000, the first course that included technology was introduced into the college and since then the number of computerised courses has increased as presented in Table 12 below.

Table 12:
Computerised Courses (integrating the use of computers)
at the College

Academic Year	Number of Computerised Courses	Number of Teacher-Educators	Number of Students
2000-1	1	1	22
2001-2	8	5	100
2002-3	18	30	300
2003-4	55	48	500
2004-5	63	70	Almost all the college's students Proposal: all students will take at least 3 courses including technology during their studies

During the academic year in which the research took place, 2004-2005, the Centre for Digital Learning (CDL) was inaugurated. It was established as a manufacturer for the development and application of teaching and learning activities combined with the use of information and communications technology (ICT). The CDL constitutes an integrated combination of a physical site and an Internet site. The physical site of the CDL is open to all, every day and throughout the day (apart from weekends) in the Computer Unit and provides developmental, research, follow-up and support and facilities for those using computerised teaching and learning. It is possible to visit and interact on the Internet site, irrespective of location (the site's address is not published for ethical reasons to prevent identification of the college in the thesis).

The CDL's staff includes academic staff, experts in the fields of research and educational technology development and development of support staff, experts in the technical field of development and design of digital tools and educational sites and their use. The technical support staff includes three people: a graphic artist, an Internet programmer and a computer technician, each entrusted with a different role and all working together to provide support, assistance, advice and follow-up for the teaching staff and students of the teacher-training college.

The CDL develops unique digital tools according to local pedagogic needs, for computerised courses (in distance learning), courses including technology in different proportions, and activities in technology-enriched environments and produces samples of teaching and learning on the net. The purpose of the CDL is to provide support and guidance for all those working in the field. Cooperation between pedagogy and technology characterises the team work in the CDL. Teacher-educators develop courses and the technical staff act in continuous cooperation in order to deepen the computer culture in the college and improve the digital environment.

The CDL aspires to respond to the needs of the college, its staff and students in the field of computer integration in learning using the following means:

1. Making technology available to the pedagogic service.
2. Providing services to the teaching staff (teacher-educators and the students in the college and in the field) such as: a telephone-integrated support system, local personal support, virtual support for learners and teachers.
3. Supervision for computerised course developers helping each course/developer to find tailor-made solutions such as: a distance and close-up support system for course developers, strategic services for the development of programmes and courses, such as platforms for self-development of courses or digital tools 'by order' according to local needs.
4. Fostering the professional development of the staff and students for lifelong learning.
5. Responding to the college initiatives and/or local initiatives of its departments.

The distance learning courses are situated in the CDL site within the college Internet site. Two platforms are used: 'Manager' and 'Highlearn'. 'Manager' is the product developed locally by the CDL. It has high graphic capabilities with specific adaptation

for each site and the course developer is able to choose between an open or closed course, but it lacks management tools. 'Highlearn' is an international platform, providing a wide variety of managerial tools, with uniform colour and forms and it requires a code and password for entrance.

The Head of Computerisation and of the CDL describes her vision for the CDL as follows:

I cannot say when but everyone will eventually get there ... I would like all the computerised teachers to also be partners in the development staff. Analysis of new tools, analysis of new initiatives, of new directions of activity. And following this participation, then each of them will lead some sort of group in the field, some sort of school, a group of teachers. They will take it from here and will spread the theory that they themselves have experienced but this time as the leader, as the teacher guiding the process in another place. Of course if they want they can come and work here too and there also, but their experience here will be transferable to another place in the education system. Perhaps also to another college but I believe that each college will need to have a house like this of their own and something similar to ours and to use it to reach outwards. Perhaps an inter-collegial centre will develop like this one – I personally would support that very much. That's all.

APPENDIX IIIB

THE RESEARCH POPULATION

The researcher wanted to know how the studied phenomenon was understood by those who experienced it and those who were involved in it (Jorgensen, 1989). From the start, she wanted to choose a research population that had features typical of a broader group, in order to aim for more generally applicable findings than would be found exclusively in the particular studied college (King et al., 1994; Hammersley & Atkinson, 1995).

Fourteen teacher-educators from one teacher-training college in Israel, teaching a full course in distance learning through the Internet participated in the research in the academic year 2004-5. They taught scientific disciplines, literacy, humanities and education in different learning streams and in all the college's year groups. All the courses were for a single semester, giving eligibility for academic acknowledgment equivalent to two hours teaching per week.

All the teacher-educators apart from Milly had in the past been primary and/or secondary school teachers. They had teaching diplomas and at some stage transferred to teach at the college. They were all teacher-educators with experience in teaching at the college. They were between the ages of 40-65. Thirteen women and one man participated in the research. There is no consideration in the research of the distinction between the man and women because the research deals with modes of teaching irrespective of gender.

Five of the participants had a third academic degree and nine of them had a second degree. The teacher-educators were all veteran residents in Israel, their mother tongue was Hebrew and they were members of the Jewish sector. The teacher-educators dealt with a variety of disciplines and had different training on the subject of distance learning. As detailed in the Findings chapter, all of them, apart from Merry and Annis had at least three years experience in teaching distance learning. All the teacher-educators apart from Fay taught during the year of the research at the college including courses taught by traditional methods.

For some of the interviewees this was their first interview and so they were very excited and some of them had been interviewed in the past and so they were perhaps less enthusiastic and perhaps the researcher missed interesting data.

APPENDIX IIIC

ETHICAL ISSUES

(Ethical Dilemmas Arising From the Research and Ways to Cope with Them: The Researcher's Personal Perspective)

The research dealt with a living case concerning people, it participated in their lives, sensed their problems, experiencing what was interesting and difficult in their lives. The informants shared their secrets with me and opened a door for me into personal previously undisclosed even intimate parts of their lives. This fact obliged me to demonstrate strong humane sensitivity, and even more to develop a professional ethic with strict codes (Fetterman, 1989; Burgess, 1989; Stake, 2000).

Moreover, in my opinion, the ethical issues of the research are not only subjects which should be handled with the greatest of care, but they also illustrate my values as an educator and researcher, values that cannot be detached from the context in which I act. Thus it was important to conduct a continuous open discussion of the ethical issues that arose from the research that I performed. The strength of a qualitative research is in its ability to uncover deep, intimate and social thoughts, it therefore exposes people and this is problematic.

In my writing I have tried to involve the readers and to create empathy. The path of empowerment and distancing may be dangerous and difficult I therefore made very sure to maintain the rules of ethics in my research. Fetterman (1989) emphasises that professional ethics are not just ethics for the sake of ethics, but rather they are also the nucleus of good science. Strict adherence to methodological procedures and rules are also a fundamental and principal part of professional ethics. Maintenance of professional ethics, *inter alia*, formed my trustworthiness as a researcher and helped me to gain access to the research site (Punch, 1998).

As a qualitative researcher, my proximity as a researcher to the informants obliged me to have an ethical firmness; it was also this that exposed me to unique ethical concerns (Wax & Cassell, 1981; Lincoln & Guba, 1989). Before the start of the research, formal consent to perform the research was obtained from the college Head. This was an essential stage in my entry to the research field (Anthanasēs & Heath, 1995). The research received all necessary permits from the university concerning ethics, before it went into action. I chose to expose all the ethical dilemmas already at the beginning of my path and to try to cope with them one by one. The main problems that arose were:

Ethical Problems concerning the Informants

The connection between the researcher and the informants in a qualitative research is complex especially in light of the fact that the researcher is the main research tool and because the participants and their experiences are the principal source of knowledge. The researcher is the initiator of the research, collecting data, analysing them, writing and publishing them. Thus the researcher is involved at each of the stages of the research, becoming an inseparable part of the final product. Moreover, qualitative research is constructed on intimate revelations by the informants, regarding their personal experiences and world-views. The two partners in this process develop a high level of involvement: the first (the informant), because of the fact that his life experiences are involved and the second (the researcher), as a result of the entry into

the world of the first participant and the desire to understand this participant in a more profound way. This high level of involvement of both participants conceals many dilemmas.

The research focused on a limited group of people, whose identity was known to the college. They began to teach in a different and innovative teaching and learning environment that on the one hand aroused enthusiasm and desire by others to emulate it but on the other hand aroused much resistance. The dilemma was deepened since this is a very well known college for teacher-training in a very small state, Israel, where everyone knows everyone. In addition I, in my role as the researcher also worked in the same college serving in a number of roles connected with the research subject, with the informants and with all the collected documents. This situation led me to think about and cope with many ethical problems that accompanied the research at each stage, from the choice of the site where the research would take place, the maintenance of materials in complete confidentiality and the relationship with the informants to the public publication of its findings.

This situation led me to choose to adopt ethical guidelines that encouraged a relationship of trust between the researcher and the informants based on concern, humanism and consideration. As Dushenik and Sabar Ben-Yehoshua (2001) note, a qualitative research is based on personal relations and reciprocal trust between the researcher and the informant. The informant is perceived as a partner in the research and not as an object which should be kept at a distance, since the reality that the research describes is a product of joint construction by both sides. Thus, the ethical component in a qualitative research with regard to the status of the participant in the research becomes a fundamental part of the research goal, an intrinsic component that cannot be detached from the scientific-methodological component of the research.

As I came closer to the research objects more questions arose: with regard to the boundaries of my connection with them, the extent of my penetration into their private world, the consideration of transgressions if they were involved in them, telling the truth with regard to the research goals, revealing or hiding their identity, supporting or criticising them (Shlansky & Alpert, 2007). I therefore took a series of steps together with the informants to maintain a high level of ethics in the performance of the research and to uphold the rights of the individual, respect for the informants and maintenance of the truth (Kelman, 1997; Seidman, 1998; Bassey, 1999; Wisker, 2008).

Before beginning the research I declared that because of the character of the research I was unable to know how the research would advance and in which directions it would lead. It was therefore important to me to think how each informant would be rewarded. Already from the start of the research we thought (both sides) about how I could show my appreciation to the informant for participating in the research. The reward was to provide professional assistance and follow-up for the teacher-educators in their teaching of distance learning. Throughout the research a dialogue continued between the informants and me and the feelings of the informants were examined. The consent which was obtained on the basis of a continuous dialogue and that obliged both sides to take part in this process, saved me the frustration of collecting data and not being able to use them, and also provided a sense of fairness for both sides.

The participants received full information concerning the research, its aims, its scope, its methods, tools and implications and gave their informed consent to participate in it. When their consent was given, the researcher promised that rules would be established to maintain their privacy and anonymity during the different stages of the research and especially at the stage of publication. I used an informed consent form in order to ensure that all informants assessed the profitability of their participation in the

research for themselves and then decided to agree (Smith, 1990; Howe & Dougherty, 1993). In addition the participants understood that participation in the research was voluntary and that their refusal to participate would not harm them in any way, nor cause them to lose benefits.

The US Federal Regulations (Department of Health and Human Services [DHHS], 1991) determine that every research that includes human subjects requires the receipt of informed consent from the participants.

The consent of the participants was valid and maintained the autonomy of the individual because it complied with the following conditions:

1. The consent was obtained on the basis of full and relevant information concerning the research goals and process and also with regard to the risks involved in giving consent. I informed each of the participants with regard to what I would do with the interview materials and especially sensitive or personal materials (Wisker, 2008).
2. The consent was given of their free will without any pressure or force of any kind.
3. I acted within the framework of the consent and did not deviate from it.
4. Each participant was given the right to retract his consent.

An additional dilemma that arose from the research was that the college and informants performed beneficial work and yet I would be forced to disguise their full name. It was possible to enforce the 'informed consent' of the informants and to note that most of them had consented that their names would be published, but since permission had not been received from all of them the names of everyone would have to remain confidential.

Because the research participants might worry about the possibility of fraudulent or malicious exploitation of the findings that had been collected, an agreement was signed between the researcher-interviewer and each interviewee according to accepted practice in the academic world that included the following matters.

1. Who, to whom and what is the purpose? The interviewees were told what they needed to do, with whom and for which purpose.
2. They knew and were familiar with my identity.
3. A declaration regarding any existing affiliations was given, and to whom to refer if problems arose in the research procedure. An explanation of the research was provided.
4. Risks of vulnerability – I informed the informants about all risks that might occur during their participation in the research. This did not involve the possibility of physical harm (which did not exist in this form of research) but harm that might be caused by things that were said. The agreement showed what I would do and how I would act to prevent this possibility.
5. Each participant had the full right to choose or decide whether or not to participate. Since there was consent from all the informants already at the first request, I did not need to face any deliberations concerning the need to pressurise or convince people. In any case if such a situation had been created I would have avoided using pressure or any harm to the participants.
6. The participants were given the right to review their consent and to withdraw from the process. I informed the informants what rights they had during the process, especially the right to view the materials and the right to withdraw

from the process. I explained to each one what I would do with the interview materials and especially with sensitive or personal materials. Thus I prevented any injury to their dignity and maintained their privacy.

7. Already at the beginning, I explained how the research results would be published and disseminated and I received the informants' consent for this.
8. Exposure of interviews to a third person (stranger) in order to transcribe them: I explained to those who had been recorded, who would be able to use the recording in this way, so that they would know that someone else would be privy to their secrets (Seidman, 1998). But in fact, in this research it was preferable to avoid the exposure of the material in this way and so I performed the transcription by myself.
9. I respected their privacy, since the informants were liable to be harmed if I published or shared details from their life story. Thus every detail was presented to them including the profile written for them (Lincoln & Guba, 1985). The right of the informants to know how the interviewer would use data from the interview was respected. Their names were altered to maintain anonymity with the use of pseudonyms and every identifying detail was deleted.
10. I was responsible for the research and for what was written. However the right of the informants to eradicate any part of the research that they did not like was maintained (Seidman, 1998). In practice no parts were deleted from the research by informants.
11. I explained to the participants how they could derive benefit from their participation in the research.

In research ethics the right to privacy is applied primarily by maintaining the informants' anonymity. For the researcher it is easier, from an ethical point of view, to report the research findings when he knows that it is impossible for readers to make any connection between the findings and the informants. However even with regard to the maintenance of anonymity difficulties arise. The strict maintenance of the informants' anonymity not only hides the informants' names. The researcher must avoid the publication of any detail that could expose the identity of the informants. Often such care clashes with the aspiration of a qualitative research to connect the findings with the time, place and personality associated with them (Smith, 1990). The need to reduce the 'thick description' (Geertz, 1973) – the rich and detailed description of the context in which the research took place – in order to minimise identifying details, may prevent the publication of essential knowledge and harm the ability to testify to the reliability of the research.

Fine (1990) was even concerned, that anonymity did not necessarily act to the informants' benefit. In those cases where the details are confidential this may make it difficult to judge the research findings correctly, the researcher finds himself protected from criticism and can exploit this unjustly in his research report (Sabar Ben-Yehoshua, 1988; Shulman, 1990).

With regard to the participants' identity, the prevailing rule is that if not agreed otherwise, the identity of the participant must remain completely confidential and pseudonyms are used. But complete masking is difficult to achieve, since other people from the location where the research took place or from the neighbourhood can often identify the informants, since it is possible to identify the location according to different characteristics mentioned in the thesis, in addition the participants may tell their colleagues about their participation in the research (Hammersley & Atkinson, 1995; Punch, 1998; Clandinin & Connelly, 2000). I therefore promised, from the start, that

the research would remain confidential and it would be published as a doctoral research work in a foreign university, using pseudonyms for all quotations.

There are those who see the researcher-informant relationship to a certain extent as a relationship of exploitation (Hammersley & Atkinson, 1995). I drew information, knowledge and insights concerning the reality lived by the informant from the informant and transformed this into an asset from which I produced certain profits, such as my academic promotion. The informant remains anonymous or actually exposed and even hurt. This is not of course what I intended. I believed that I could actually help the participants and the professional group they belonged to through the research and to advance their interests by bringing their stories or problems to the attention of the professional community. Sometimes the very fact of the research's production, as a form of interest in the informants' world that allows them a voice, constitutes emotional support for them (Lieblich, 2003).

One of the ways to cope with the problem of informants' vulnerability is to allow the informants to read the text before its publication and to receive their reaction. To my delight the informants agreed and there was no need to negotiate with them in regard to their remarks or demands because these did not occur (Lieblich, 2006). I had seriously deliberated whether to give the text for an early reading by the informants, since this move might lead to an attempt to delete or change parts of it, in contradiction to my desires and especially with regard to the exposure of the material before the college management which might perhaps wish to hide certain matters. I was lucky and pleased that I did not have to face this dilemma. My method of action led to positive activity. The early reading by the informants gave me an additional opportunity to clarify matters and to present a different view of the studied reality.

To summarise: the principles of maintaining benefit for the informants, their dignity and trust were upheld. I shared the interpretation of the findings with them and intentional efforts were made to present a wide range of opinions accurately in the spirit of the informants' intentions (Dushenik & Sabar Ben-Yehoshua, 2001).

The research literature indicates reservations concerning the ability of the qualitative researcher to provide full details, in advance, concerning the research. Wax (1995) argues that in a qualitative research not only is the informant exposed before the researcher, but the researcher is also exposed to the informants. In Wax's opinion, the informants have a large extent of power to defend themselves against the interference of the researcher. Based on these two arguments, Wax sees no reason for informed consent in a qualitative research. Punch (1998) claims that researchers using the qualitative approach demonstrate over-sensitivity to the informants' privacy. He claims that the work-life of the informant is not completely within the private domain; therefore research that deals with this domain presents less risk to the individual's authority. There are also functions such as teaching, which necessitate public accounting. According to Punch some research actually realises the duty of these function holders to demonstrate transparency and to face public criticism. In my research, in contrast to these views of Wax (1995) and Punch (1998), I followed the more common and careful attitude to ethical dilemmas described above.

Ethical Dilemmas concerning the Researcher

The researcher is the initiator of the research, collecting the data, and analysing them, writing up the thesis and publishing it. The researcher's involvement in each of these stages makes the researcher an indivisible part of the final product and this situation is accompanied by ethical dilemmas:

1. The influence of the researcher's status – the interview constructs an interviewer-interviewee relationship that is influenced by the goal, the structure and method of the interview. In my role as the sole interviewer there were influences stemming from my status and gender (Seidman, 1998). As I served two functions both as researcher and also as an employee in the studied institution, it was difficult to avoid these influences, especially as I was known and had a certain status in the 'research arena' and I could not become a 'stranger', a status which might enable me to discover unexpected things.
2. The researcher's difficulty in entering the research site – maintaining professional ethics, among other things, increased my trustworthiness and helped me to gain access to the research site (Punch, 1998).
3. The desire for a reliable publication of the findings by the researcher.

Ethical Dilemmas concerning the Collected Data

Ethical dilemmas relating to the collected data are presented below as they appear in the research literature. Solutions are noted that the researcher used in the present research to cope with these dilemmas.

1. Preventing access for any person to the collected data – all the documents, recordings and the researcher's log were kept in a closed and locked cupboard in my home. In addition the computer on which I stored the transcription of the interviews, the documents and my entire research work were only stored on my personal computer and are accessed with a code and not on the computer network of the college. The backup CD is also kept in a locked cupboard (Bassey, 1999; Mason, 2001).
2. Scrambling different materials in order to distort their meaning – all the data files were maintained in a methodical way in a series of files. Each interview, document as a separate file. The questions and answers concerning the questions were kept together so that it would always be possible to return to the source. Moreover in the thesis they were written in a different font in order to distinguish them from the other materials (Bassey, 1999).

Ethical Dilemmas at the Time of Writing-up the Thesis

Fine et al. (2000) suggest a list of questions that the researchers should ask themselves in order to make proper ethical decisions. I found that I could give a positive response to all these questions:

1. Did the researcher make a connection between the 'voices' and the 'stories' of the individuals and the historic structural and economic system of relations within which they are located? I reached all the documents and records on this subject in the college and was able to link them to the content articulated by the 'voices' of the interviewees.
2. Did the researcher describe the day-to-day reality – the routine, which constitutes the main component of people's lives and not what was extraordinary and sensational? By identifying repetitive themes, I was able to see that the behavioural pattern was neither random nor extraordinary.
3. Did the researcher act to explain to the readers the attitude underlying the words of those who provided the information? This was done by providing a description of the college and the history of computerisation in the college.

Ethical Dilemmas relating to Bodies who finance the Research

Even without a specific demand or implicit threat, the natural tendency for reciprocity, the desire to return a favour may cause a distortion of the research in favour of commercial interests of those who finance the research (Schafer, 2004). A connection, support or financial grant from commercial companies who provide services or hardware concerning teaching on the Internet may influence the research process and its results. In the background lay Hammersley and Atkinson's (1995) warning regarding conditional permission provided by organisations to enlist the researcher into their ranks by promising beforehand to obtain their approval of publication of the research findings. They remind us that organisations exert all possible efforts in order to ensure that the research findings relating to them are presented in a positive light. I therefore chose to waive any research grant, financial assistance, receipt of services or any other such relationship with such entities, in order not to engender a situation where other bodies with different interests would be involved in the research and might influence its directions and findings.

To summarise: the subject of research ethics was interwoven like a silken thread through each stage of the research up until the writing of the thesis. This was a complex and important subject and I saw it as my primary obligation as a researcher performing research in a place in which I worked and collecting data from people and about people, to devote this special sub-chapter to this subject in the thesis.

The Researcher's Role

The qualitative researcher is not situated above the research or outside it. The researcher's self is interwoven within the research (Woods, 1996). The researcher constitutes an inseparable part of the investigation. She is involved as an observer-participant or as the interviewer. But at the same time the researcher also separates herself from the studied situation in order to rethink the meanings of the experiences. In order to understand a particular world the researcher must become a part of it and at the same time to remain separate from it, belonging and distinct (Patton, 1990). Thus qualitative research depends on the qualities of the researcher as the main channel for the data-collection and data-analysis (Merriam & Simpson, 1984).

Qualitative researchers choose to use themselves and other people as the main tool for data-collection. *'The man is the research tool'* (Lincoln & Guba, 1985) because only the human tool has the necessary characteristics to cope with a vague and unclear situation. The 'human tool' has the ability to react and is characterised by sensitivity and the ability to relate to all the environmental and personal clues that arise. The human tool has the ability to adapt, and it is able to simultaneously collect data connected with multiple factors and at a number of levels. The human tool is able to understand multi-disciplinary concepts and ideas and can combine the parts into one holistic whole (Lincoln & Guba, 1985). This concept is supported by Merriam (1998) who notes a number of characteristics that distinguish the human researcher from other research tools: the researcher reacts to the context; she is able to alter her methods according to the circumstances. The overall context can be taken into account; knowledge concerning the situation can be broadened by the researcher's sensitivity to non-verbal aspects. Qualitative research is a situational activity that enables researchers to locate themselves in relation to the studied world. Kincheloe (2001) following Denzin and Lincoln related to the qualitative researcher as a tradesman, 'a jack of all trades', a 'bricoleur' who uses the different tools and varied theoretical materials and knowledge from different disciplinary fields in order to establish his observations of phenomena and to interpret them. Kincheloe (2001) dubbed the products of the researcher, the writings, as 'bricolage'.

Shkedi (2005) noted that the principle role of qualitative researchers is to assist people to tell their stories, to help them to become aware of the fact that they have stories to tell, to help them to expose their stories, to clarify them and present their meanings both for themselves and for the researchers. As a result of their interviews with the researcher, the teacher-educators felt that the researcher had provided them with a platform and that they received an attentive ear so that they could tell their stories. *This is actually the first time that I put the metaphor into words. All that I told you regarding this metaphor I have not yet told to anyone* (Shandy). The researcher went directly into 'the informants' heads' and understood how to present these people, as they understood themselves (Zeller, 1995).

First of all it made me conscious of where I was and what I was doing, what I was not doing, where I needed to get to and suddenly it was all upside down, because on the one hand of what I told you about the path which I hadn't thought about, on the other hand I understood how much I could see a path that wasn't bad (Lee).

Strauss and Corbin (1991) indicate that researchers should be sensitive to and aware of their own personal characteristics in order to understand the subtleties of meanings of the data.

Researchers can relate to the studied situation at different levels of sensitivity, influenced by their prior experiences or by reading the relevant professional literature on the studied subject from a number of sources including research and other relevant documentation. If the researcher is lucky enough to have acquired professional experience in the field, this means greater understanding of the way that things occur in the field, why and what will happen under certain circumstances. This knowledge is brought into the research situation and helps the researcher to understand events and actions that are seen and heard, more rapidly than a researcher without such previous experience. Strauss and Corbin (1991) emphasise that despite the advantage which the researcher's experience affords, the researcher must be careful not to misread the studied field. In order to maintain theoretical sensitivity and openness during the research they recommend separating thoughts from prior personal experience, focussing on what is happening, listening carefully to things that are said by people, to ascertain what their intention is and to focus only on the existing data.

In the present research, the researcher recorded the words of the interviewees meticulously and the observations and in the analysis of her findings she tried to adhere to the words and concepts that they expressed. The researcher's familiarity and involvement in the research subject also constituted an advantage as noted above. Jorgensen (1989) claimed that researchers need to feel they are part of the culture to which the informants belong and to interpret the words and gestures as is customary among the participants in the studied culture or sub-culture.

Reality is perceived as a human structure formed by the cultural and personal conditions of the studied subject and it does not exist without the subject, since the studied subject is part of that reality. This reality is constructed from interpretation performed by the researcher and also by the studied subject. But it should be remembered that either covertly or overtly researchers use distinctions, interpretation and assessments of their own and of others regarding the studied phenomenon (Peshkin, 1993; Sciarra, 1999; Merrick, 1999).

Lincoln (2002) equipped the qualitative researcher with an open and developing list of criteria that includes the steps that the researcher should perform. Firstly, the qualitative researcher should locate himself in relation to the local historic, cultural and social context in which he performs the research, far from absolute axioms and wide-ranging generalisations.

The next criteria stems from the first criterion: the research should be directed to the community that it serves so that it is possible to implement the findings of the research for the welfare of that community. According to a further criterion presented by Lincoln the researcher is required to relate to the voice of the research participants. In this context, it is recommended that the researcher relates to the following questions: Who speaks in the research? For whom? For which goal? Who speaks for those who do not have access to the corridors of knowledge and power?

Another criterion is the 'reflective' feature – a term that has many meanings, and is defined by Lincoln as the ability to enter a different state of consciousness in order to understand the other well. Moreover, the researcher must have a sense of sacredness and deep concern for human dignity, for justice and interpersonal respect. Finally Lincoln formulates a criterion that relates to the division of the profits from the research with those who participate in it (Lather, 1995). In other words the researcher must take into account that the profits and advantages (such as those from publication, externalising the knowledge etc.) that he achieves as a result of the research and the process of production of knowledge are the result of joint work with the other participants in the research. The qualitative researcher who is equipped with this open and variable list of criteria, positions himself out of choice in a local context facing a particular community of people, attentive to the voices of the members of that community and aspiring to construct meaning in cooperation with the members of the community and for their benefit, out of deep concern for inter-personal justice and respect.

Through her research, the present researcher brought about change in thinking and re-examination of the subject of teaching distance learning in the college. In one of the staff meetings the academic coordinator of the college said:

A demand has been created for courses in distance learning even in Years 3 and 4. We have turned to the disciplines, not only the domain of computer teachers. The researcher asked me what are the criteria for assessment. Whether work on the Internet is trustworthy or not trustworthy. We decided to set the wheels in motion and the members of the computer unit met in a first session ... a question was presented to the computer unit. What are the criteria? What do you know about the course? To define criteria that would be acceptable to everyone.

One of the methodological problems of qualitative research is to find the optimal path between involvement, integration and empathy on the one hand and distance and critical thinking on the other hand. Involvement is essential in order to understand the viewpoint of others, as they see it, and to see how they see others, in order to identify their problems and concerns and in this way to decipher their discourse and behaviour. To attain this, the researcher needed to have access to the informants. She needed to develop intimate relations, of trust and friendliness, forming a relationship, identifying matters with sensitivity for the informants and being able to assess their feelings and their cognitive inclinations. This type of involvement must be reflective. Being reflective means to stop and think, to carry on a discourse between the researcher and herself, to process what has happened in the past and to be able to stand to the side and re-examine learnt understandings (Maykut & Morehouse, 1994; Woods, 1996). From one aspect the researcher wanted to know how the studied phenomenon was understood by those who experienced it and were involved in it (Jorgensen, 1989) but from another aspect the researcher needed to maintain a distance from the interviewees in order to be able to ask and investigate and not to share her own thoughts on the issues (Seidman, 1998).

Research is a political act since it does not only reflect an existing situation, but it influences and creates reality, either by providing support, authorisation and reinforcement for an existing reality or by transmitting criticism and a call for change. The researcher's attitude with regard to the given reality influences the choice of the research subject and the research questions and also the choice of the research procedure that is used. The words that the researcher chooses, in order to describe the findings and conclusions, give structure to the objects/subjects that the research deals with and the power relations between them (Ife, 1997).

APPENDIX IIID

PARTICIPANT INFORMATION SHEET

The Research Project

The title of project is: "Role perceptions of the online educator as a manager of learning environment in an education college in Israel".

The aim and focus of the research is to investigate and define the role of the teacher-educator as the manager of an on-line learning environment.

The study will explore this issue from the viewpoints of the following stake-holders: the college management, the online teacher-educators themselves, teacher-educators other than online teacher-educators, the student's teachers in the various grades and of various subject specialties; and technical support staff.

You are invited to participate in the project.

The research organizer is Smadar Bar-Tal, PhD Student at APU, School of Education.

The result of the study will relate to managerial aspects of the online teacher-educator system. The findings and conclusions of this research may be adopted by College Executive Management, to upgrade the teaching quality of online teacher-educators in the Teacher-training College.

The research is self-funded by the researcher as a part of the PhD study.

Contact for further information:

Smadar Bar-Tal, teacher educator in L. COLLEGE
Permanent Address: Haprahim 26, P.O.Box 70, Rishpon 46915, Israel
Home Tel : 00-972-9-9507284

Mobile Tel: 00-972-56-567310

Electronic Address: **asbartal@netvision.net.il**

Telefax Number: 00-972-9-9514982

Your Participation in the Research Project

You have been invited to take part at the research since you are the student's teacher or a staff member in L. COLLEGE. Thank you for agreeing to take part in the project. Before you begin you should know that: Your participation is entirely voluntary. You are free to refuse to answer any question, you are free to withdraw at any time. I would be grateful if you would complete the form and return the form to Smadar Bar-Tal at the above address.

If you agree to take part in the research, you will be asked to give your consent to participant observation and to answer open-ended questions on on-line teaching and learning, personal teaching experience, and management of learning. Any information collected from you will be confidential and anonymous. Pseudonyms will be used; no names will be attached to the interview transcript. The information will be kept in a secure place. No personal details will be collected or stored. Your agreement to participate in this research will not compromise your legal rights in case of any disagreement.

APPENDIX III E

PARTICIPANT CONSENT FORM

Name of participant:

Title of the project:

Role perceptions of the online educator as a manager of learning environment in an education college in Israel

Main investigator and contact details:

Smadar Bar-Tal, teacher educator in L. COLLEGE
Permanent Address: Haprahim 26, P.O.Box 70, Rishpon 46915, Israel
Home Tel : 972-9-9507284
Mobile Tel: 972-56-567310
Electronic Address: **asbartal@netvision.net.il**
Telefax Number: 972-9-9514982

Members of the research team:

1. I agree to take part in the above research. I have read the Participant Information Sheet which is attached to this form. I understand what my role will be in this research, and all my questions have been answered to my satisfaction.
2. I understand that I am free to withdraw from the research at any time, for any reason and without prejudice.
3. I have been informed that the confidentiality of the information I provide will be safeguarded.
4. I am free to ask any questions at any time before and during the study.
5. I have been provided with a copy of this form and the Participant Information Sheet.

Data Protection Act 1998: I agree to the University¹ processing personal data which I have supplied. I agree the processing of such data for any purposes connected with the Research Project as outlined to me. I further agree to the University processing personal data about me described as Sensitive Data within the meaning of the Data Protection Act 1998.

Name of participant (print).....Signed.....Date.....

Name of witness (print).....Signed.....Date.....

YOU WILL BE GIVEN A COPY OF THIS FORM TO KEEP

--

If you wish to withdraw from the research, please complete the form below and return to the main investigator named above.

Title of Project:

"Role perceptions of the online educator as a manager of learning environment in an education college in Israel"

I WISH TO WITHDRAW FROM THIS STUDY

Signed: _____ Date: _____

1 "The University" includes APU and its partner colleges

APPENDIX IIIF

LETTER OF APPROVAL FROM APU

Bishop Hall Lane
Chelmsford
Essex CM1 1SQ
01245 493131
www.apu.ac.uk

20 July 2004

Smadar Bar-Tal
c/o A D Atid Lekidum Ltd
Beit Rothenberg
77 Hannasi Ave
HAIFA
ISRAEL



Dear Smadar,

Application for Approval of Research Proposal

I am pleased to inform you that, confirmation of your supervisory team and ethics approval has been received. I can confirm that Chair's action has been taken and formal approval of your research proposal is confirmed.

This decision will now be passed to the University's Research Degrees Committee for ratification.

A copy of this letter has been sent to your Director of Studies, Supervisor and School Director of Research.

Yours sincerely,

Beverley Pascoe
Secretary
Education Joint Schools Research Degree Sub Committee Board

cc: Dr Roger Taylor
Dr Gill Robinson
Prof Jeff Dorman
Maxine Levy

For information about APU call our Contact Centre on 0845 271 3333
or email us at answers@apu.ac.uk

APPENDIX IVA

THE LEARNERS' LEARNING STYLES

One of the goals of the teachers' teaching is to provide a response to different types of learner populations. In the college in which the research took place there were adult learners studying teaching. Further on in this discussion the teachers' different teaching styles are examined in accordance with the learners' different learning styles, including adult learners and distance learners.

Literature relating to the subjects of teaching and learning states that computerised teaching enables the teaching to be adapted to the needs, abilities, learning styles and cultural backgrounds of the learners (Lynch, 2002). Learners benefit from personal consideration by the knowledge providers, who are not physically present but transmit their first-hand knowledge (Berge & Collins, 1995). Effective learning takes place in a learning environment in which there is easy access to varied information and the learner chooses the relevant information according to his/her preferences, inclinations and curiosity, transforming it through a process of independent learning into structured knowledge (Olson, 2007). The assumption is that the use of digital technology to access knowledge develops high level thinking skills (Henderson & Nash, 2007). The research findings in this study show that some of the modes provided a response to one particular type of learner style and left the other types of learner without response to their needs.

Table 13 below presents a comparison between two models of learning style: the model of Felder & Silverman (1993) and the model of Kolb (1984) and their correspondence with the present research findings.

**Table 13:
Two Models of Learning Styles**

The Model of Felder & Silverman (1993)		The Model of Kolb (1984)	The Present Research	
Dimension	Learning Style	Learning Style	Teaching Style	Adaptation and Innovation in Teaching and Learning for Distance Learning
Preferred Method for Processing Information	Active Tends to understand and retain information through active experience of the discussed subject, discussing the subject, implementing or explaining it to others.		Holistic interactive	<p>The use of virtual tools enabled learners to be involved at higher frequencies in the discussion and interaction with others.</p> <p>In the holistic mode the learning was collaborative, guiding the group and using a variety of data representations in order to enable learners to experiment and explain them/ to others.</p>
	Reflection Prefers first to think about the subject quietly. Prefers to work alone	Diverger Needs to see the complete information before able to see its parts. Prefers to work alone and to think alone and slowly about the new knowledge. Needs time for thought about the material in order to organise perceptions and planning.	Representation	<p>All the materials were already found in a variety of data representations on the site from the beginning of the course and were accessible.</p> <p>The learning method was personal and independent for each learner, who received formative assessment without a grade.</p> <p>Distance learning unlimited by place or time enabled each learner to have an independent space of time in order to learn.</p>
Orientation	Purposeful Tends to process and retain information through learning and memorisation of details of information. Tends to be patient with regard to masses of details and good at memorising		Representation	<p>Due to the use of a variety of data representations and the tools found on the Internet, the learner can vary the learning method and manner in which facts are memorised. Studied areas required learning and memorisation.</p>

The Model of Felder & Silverman (1993)		The Model of Kolb (1984)	The Present Research	
	facts.			
	<p>Curious</p> <p>Inclination for abstract thinking.</p> <p>Works and retains knowledge through research and discovery.</p> <p>Likes innovations. Prefers to reveal connections between new facts independently.</p>	<p>Accomodator</p> <p>Needs to try everything.</p> <p>Plans systematically but prefers to try things out.</p>	Holistic	<p>On the course site there was an abundance of materials accessible for everyone at any time.</p> <p>The learner could search for information, materials and people in other locations and to compare, implement and integrate them.</p>
Manner of Progress towards Understanding	<p>Sequential</p> <p>Tends to develop understanding in consistent-continuous steps, in a linear and logical manner.</p>		Representation, Organisational, Interactive	The order of learning was dictated by the teacher and completed stage after stage in a linear fashion.
	<p>Global</p> <p>Learn in large leaps, do not see the sequence at the beginning of the learning of subject but absorb it randomly.</p>		Holistic	<p>Due to the open and flexible organisation of teaching, there was a variety of data representations and interactive possibilities.</p> <p>The learner could jump randomly from subject to subject.</p>
Preferred manner of presentation/absorption	<p>Visual</p> <p>Remembers and learns better when the information is presented visually in pictures, diagrams and films.</p>		Representation, holistic	The variety and options offered by the Internet and the digital tools presented the learner with a wide range of possibilities and variation of learning methods.
	<p>Verbal</p> <p>Absorbs better when the information is presented verbally</p>		Organisational Interactive	The learner can adapt the size of the font, colour and edit the text, enabling variety and personal adaptation of the verbal text

The Model of Felder & Silverman (1993)		The Model of Kolb (1984)	The Present Research	
				for each learner.
		Converger Reads the instructions and follows them meticulously First needs the details in order to construct the overall picture.	Organisational Representation	The work was focused, organised and ordered by the teacher. The teacher thought it importance to organise the teaching and ensure that the learners' timetable was maintained. Support by computer applications for the organisation and management of teaching by the teacher helped the learner to follow the instructions meticulously.
		Assimilator Learns intuitively through trial and error. Needs to actively experiment with the learning and needs first to see the complete picture before going on to study its parts.	Interactive	Materials and tasks were found on the site were pre-determined. The student could make several writing attempts and try to reach a high level product in order to continue onwards and to integrate the information in the final written version.

To summarise: due to the use of computer applications, virtual tools and the Internet, the teacher-educators who used different modes broadened the variety of options and support for all types of learning styles for each learner. Each mode was suitable for a different learning style of the learner.

APPENDIX IVB

ORGANISATION AND MANAGEMENT OF DISTANCE-TEACHING ADAPTED FOR THE ADULT LEARNER

The thinking and understanding of the teacher-educators from all the modes included a desire and need to provide a response for the needs of the adult learner as explained in the relevant literature (Knowles, 1984a; 1984b; Stolvitch & Keeps, 2002; Frey & Almag, 2003; Cercone, 2008).

But did the teacher-educators in fact use strategies suitable for the adult learner studying in distance learning? (Lynch, 2002, p.34).

Table 14:
Teaching Modes and Distance-teaching Strategies for the Adult Learner

Characteristics of the Adult Learner Lynch(2002)	Teaching Modes	Existence of the Characteristics	Explanation
A large reservoir of knowledge and experience serves as a learning source	Organisational	No	Teacher-focused teaching Minimal use of learner's knowledge
	Representation	No	Learner-focused teaching but constructed on materials brought by the teacher. No dialogue is created with the learners on the base of their previous knowledge because there is no teacher-learner or learner-learners interaction
	Interactive	Yes	The teacher uses the discussion group as a means for dialogue with learners and to share the knowledge with them. In this way the students can contribute knowledge to their colleagues in the group.
	Holistic	Yes	As for the interactive mode The teacher also allows individual students to lead the learners' group and thus the student contributes knowledge and experience to the entire group.
Holds values and views that accept the opportunity for critical assessment of the new knowledge.	Organisational	No	The teacher expects to receive uniform answers from learners.
	Representation	No	The learner comes with no previous knowledge on the studied subject, since these are subjects in which the learner had no previous knowledge or only sparse knowledge.

Characteristics of the Adult Learner Lynch(2002)	Teaching Modes	Existence of the Characteristics	Explanation
	Interactive	Yes	The learners used a combination of conflicting opinions in their tasks.
	Holistic	Yes	As in the interactive mode. In the first face-to-face meeting learners were given a stage and time for this. Learners were given a space for discussion by the teacher and were allowed individually to challenge existing concepts and to bring new ideas and information
Independent thinkers and hope to be part of an opinionated community of learners.	Organisational	No	The teacher does not guide the teaching towards the construction of a community of learners.
	Representation	No	As above
	Interactive	No	The student thinks independently but the centrality of the teacher prevents the creation of a community of learners.
	Holistic	Yes	The teacher enables learners to be part of an opinionated community of learners.
Take a problem-centred approach to learning and want to apply it to the real-world environment in which they live.	Organisational	No	Teacher-focused teaching and many small uniform and focused tasks.
	Representation	No	The material is academic and structured and relates to the studied disciplines.
	Interactive	No	Studies revolve around a central issue or subject.
	Holistic	Yes	The teacher teaches through a community of learners, a variety of data representations and is open to surfing even to other new subjects while notifying others.
Express less interest in (theory) survey types of courses and more interest in problem-solving and product creation.	Organisational	No	Courses were taught at an academic level and included theories.
	Representation	No	
	Interactive	No	

Characteristics of the Adult Learner Lynch(2002)	Teaching Modes	Existence of the Characteristics	Explanation
	Holistic	Yes	The teacher allowed learners to suggest directions for learning and to present subjects.
Exhibit great variation in learning styles (individual differences increase with age, as des the desire to use a variety of styles to comprehend	Organisational	No	The teacher did not vary the teaching materials and did not use different teaching methods. Everything was uniform and so there was no expression of different learning styles.
	Representation	Yes	The teacher varied the teaching materials and used them in the hope that all the learners would find their own individual path, and teaching was learner-focused. However the lack of personal interaction was liable to block adaptation to various learning styles.
	Interactive	Yes	The teacher varied the teaching methods and thus served as a sort of 'private teacher' for each learner and responded to the learner's individual needs and requests, but data representation was limited to verbal representations only.
	Holistic	Yes	The teacher used a variety of learning materials and teaching methods.
Expect that they will be responsible for their own learning.	Organisational	Yes	All the teacher-educators in all the modes felt that the responsibility for learning was imposed on the learner.
	Representation	Yes	
	Interactive	Yes	
	Holistic	Yes	

The above table, Table 14, indicates a dichotomy in relation to the existence of different characteristics and the adaptation of the course to the needs of the adult learner between the different teaching modes. Additionally, the holistic mode obviously provides the broadest response to the needs stemming from the adult learner's different characteristics, while other modes only provide a partial response.